

Health Care Financing Grants and Contracts Reports



Evaluation of the Maximum Allowable
Cost (MAC) for Drugs Program
Final Report

PUBS
HG
9391
.5
U5
L443
1981

Published by the Health Care Financing Administration
Office of Research, Demonstrations, and Statistics

Health Care Financing Grants and Contracts Reports

The Health Care Financing Administration was established to combine health financing and quality assurance programs into a single agency. HCFA is responsible for the Medicare program, Federal participation in the Medicaid program, the Professional Standards Review Organization program, and a variety of other health care quality assurance programs.

The mission of the Health Care Financing Administration is to promote the timely delivery of appropriate, quality health care to its beneficiaries—approximately 47 million of the nation's aged, disabled, and poor. The Agency must also ensure that program beneficiaries are aware of the services for which they are eligible, that those services are accessible and of high quality, and that Agency policies and actions promote efficiency and quality within the total health care delivery system.

HCFA's Office of Research, Demonstrations, and Statistics (ORDS) conducts studies and projects that demonstrate and evaluate optional reimbursement, coverage, eligibility, and management alternatives to the present Federal programs. ORDS also assesses the impact of HCFA programs on health care costs, program expenditures, beneficiary access to services, health care providers, and the health care industry. In addition, ORDS monitors national health care expenditures and prices and provides actuarial analyses on the costs of current HCFA programs as well as the impact of possible legislative or administrative changes in the programs.

ORDS also annually conducts over 200 intramural and extramural research, demonstration, and evaluation projects. The Health Care Financing **Grants and Contracts Reports** series presents the final reports from selected ORDS/HCFA-funded extramural projects.

Health Care

HG
9391.5
.U5
L443
1981
c-2

Financing Grants and Contracts Report

Evaluation of the Maximum Allowable Cost (MAC) for Drugs Program

Final Report

This report was made pursuant to Contract No. 500-78-0019 between the Office of Research, Demonstrations, and Statistics/Health Care Financing Administration and Abt Associates Inc.

A. James Lee, Ph.D., Project Director
Allen Dobson, Ph.D., HCFA Project Officer

Authors: A. James Lee, Ph.D.
Dennis Hefner, Ph.D.
Ralph L. Hardy, Jr.

Published by DHHS
Health Care Financing Administration
Office of Research, Demonstrations
and Statistics
April 1981

ACKNOWLEDGEMENTS

The authors thank the many state Medicaid drug program directors or pharmacist consultants who participated in the Survey of Medicaid Drug Programs. We especially wish to thank the pharmacist consultants in the five study states--George Levey in Massachusetts, Michael O'Donnell in Maine, John Bush in Minnesota, Herbert Bates, Jr. in Tennessee, and Debbie Dodson in Arkansas. We also thank those who assisted in preparing the data--John Tripoddi at Pilgrim Health Systems (Massachusetts), John Campbell at Health Systems Institute (Maine), and Charles Federspiel and Wayne Ray at Vanderbilt University (Tennessee).

We thank the present and former MAC program staff--Vince Gardner, Peter Rodler, Charles Spaulding, and Thomas Fulda--for furnishing various information and data. We also thank James Morrison at the Food and Drug Administration.

Thanks go to both Maureen Nute and Gale Halpern for expertly coordinating production of this and other reports. Steven Edberg and Michael Schwartz gave superb systems analytic support and showed remarkable fortitude and good humor in contending with the idiosyncrasies of claims data from five different Medicaid programs.

Feather Davis was the HCFA Project Officer. Our debt to Dr. Davis is immense.

A. James Lee
Project Director

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1.0	<u>INTRODUCTION: OVERVIEW AND SUMMARY</u>	1
1.1	Findings	3
	1.1.1 MAC-Related Savings	4
	1.1.2 EAC-Related Savings	7
	1.1.3 Other Findings	11
	1.1.4 General Conclusions	12
1.2	Organization of the Report	12
2.0	<u>BACKGROUND</u>	13
2.1	Overview of the Drug Industry	13
2.2	Antecedents of the MAC-EAC Program	16
2.3	The MAC-EAC Regulations and Their Implementation	20
	2.3.1 MAC	20
	2.3.2 EAC	22
	2.3.3 Usual and Customary	23
3.0	<u>STUDY HYPOTHESES AND CONCEPTUAL PERSPECTIVE</u>	25
3.1	Hypotheses Concerning the Impact on the Government	25
3.2	Hypotheses Concerning the Impact on Drug Manufacturers	26
	3.2.1 Pricing Strategy	29
	3.2.2 Marketing Strategy	32
	3.2.3 R&D Strategy	33
3.3	Hypotheses Concerning the Impact on the Retail Pharmacy	37
3.4	Hypotheses Concerning the Impact on Physicians	40
3.5	Hypotheses Concerning the Impact on Consumers	41

TABLE OF CONTENTS
(continued)

<u>Section</u>		<u>Page</u>
4.0	<u>SURVEY OF MEDICAID DRUG PROGRAMS</u>	43
4.1	Administration of the Survey	43
4.2	Survey Findings	44
	4.2.1 Reimbursement Methods - Ingredient Costs	44
	4.2.2 Reimbursement Methods - Professional Fees	48
	4.2.3 Program Restrictions	52
	4.2.4 Other Areas Covered by the Survey	58
5.0	<u>MAC-EAC EFFECTS IN FIVE STATES</u>	61
5.1	State Selection	61
5.2	MAC/EAC Implementation in the Five States	62
	5.2.1 Massachusetts	62
	5.2.2 Maine	64
	5.2.3 Minnesota	66
	5.2.4 Tennessee	66
	5.2.5 Arkansas	67
5.3	Data and Data Preparation	67
5.4	MAC-Related Savings	69
	5.4.1 Chlordiazepoxide HCL	73
	5.4.2 Propoxyphene HCL	78
	5.4.3 Ampicillin	80
	5.4.4 Penicillin VK	85
	5.4.5 Tetracycline HCl	90
	5.4.6 Conclusion	96
5.5	EAC-Related Savings	98
5.6	Administrative Costs	99
	5.6.1 Federal Costs	99
	5.6.2 Incremental State Costs	105

TABLE OF CONTENTS
 (continued)

<u>Section</u>	<u>Page</u>
5.7 Other Program Effects	109
5.7.1 Pharmacy Participation	110
5.7.2 Pharmacy Dispensing Patterns and Losses	111
5.7.3 Dispensing Fee Levels	114
5.7.4 Prescribing Behavior	117
5.7.5 Pricing Behavior	121
6.0 <u>AN ECONOMETRIC ANALYSIS OF MEDICAID DRUG REIMBURSEMENT EXPERIENCE IN THE STATES</u>	129
6.1 The Model	131
6.1.1 Demand Function	136
6.1.2 Inverse Supply Function	138
6.1.3 Dispensing Fee and Ingredient Cost Functions	140
6.2 Estimation	141
6.3 Data	143
6.4 Results	144
6.4.1 Structural Equations	150
6.4.2 Reduced-Form Equations	151
6.5 Conclusion	158
<u>BIBLIOGRAPHY</u>	159
<u>APPENDIX A: REVIEW OF MAC-EAC EVALUATION LITERATURE</u>	A-1
<u>APPENDIX B: SURVEY INSTRUMENT--SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS</u>	B-1
<u>APPENDIX C</u>	C-1
State Medicaid Drug Program Reimbursement Methods 1974 through 1978	C-3
State Medicaid Drug Programs Restrictions 1974 through 1978	C-11
State Medicaid Drug Program Professional Fees 1974 through 1979	C-19
Status of Substitution Laws December 1978	C-27
Administration of Medicaid Drug Programs	C-31
Individual State Profiles	C-35

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1-1	MAC-Related Savings on Five Products and the MAC-Related Costs in Five Study States, Annual Projections, 1979	5
1-2	EAC-Related Savings and Costs in Five Study States, Annual Projections, 1979	5
2-1	National and Government Drug Expenditures in FY 1974 and Projections for FY 1976	13
2-2	Sales of Drugs and Patent Expirations	19
4-1	Reimbursement Methods - 1976	46
4-2	Number of States Using Various Methods of Determining Ingredient Cost, 1974-1978	47
4-3	Professional Fee Information by Year	51
4-4	Distribution of Fixed Fee States Across Fee Levels in 1976 and 1978	51
4-5	Average Fee by Region, 1976 and 1978	52
4-6	Program Restrictions - 1978	53
4-7	Number of States with Certain Program Restrictions by Year	54
4-8	Average Drug Cost Per Recipient by Restrictiveness of State, 1978	57
4-9	Percentage of Population on Medicaid by Restrictiveness of State, 1978	58
5-1	Federal and State MAC Implementation Dates in the Study States	63
5-2	Cost Per Unit, Cost Per Prescription, and Percent Represented by Brands of Propoxyphene HCl 65 Mg. Compound Capsules: Minnesota	71
5-3	Chlordiazepoxide HCL, 5 Mg, 10 Mg, and 25 Mg Capsules-- Per Unit and Per Prescription Savings, By State, Most Recent Study Period	75
5-4	Chlordiazepoxide HCl: Savings Based on Cost Per Unit	76

LIST OF TABLES
(continued)

<u>Table</u>		<u>Page</u>
5-5	Chlordiazepoxide HCl: Savings Based on Cost Per Prescription	77
5-6	Propoxyphene HCl: Per-Unit and Per Prescription Savings, By State, Most Recent Study Period	79
5-7	Propoxyphene HCl: Savings Based on Cost Per Unit	81
5-8	Propoxyphene HCl: Savings Based on Cost Per Prescription	82
5-9	Ampicillin, 250 Mg and 500 Mg Capsules: Per-Unit and Per-Prescription Savings, By State, Most Recent Study Period	83
5-10	Ampicillin: Savings Based on Cost Per Unit	86
5-11	Ampicillin: Savings Based on Cost Per Prescription	87
5-12	Penicillin VK, 250 Mg and 500 Mg Capsules: Per-Unit and Per-Prescription Savings, By State, Most Recent Study Period	88
5-13	Penicillin VK: Savings Based on Cost Per Unit	91
5-14	Penicillin VK: Savings Based on Cost Per Prescription	92
5-15	Tetracycline HCl, 250 Mg and 500 Mg Capsules: Per-Unit and Per-Prescription Savings, By State, Most Recent Study Period	93
5-16	Tetracycline HCl: Savings Based on Cost Per Unit	94
5-17	Tetracycline HCl: Savings Based on Cost Per Prescription	95
5-18	Projected Annual Reimbursement Savings on the Five Initial MAC Products, by State	97
5-19	EAC-Related Savings: Per-Unit and Per Prescription Savings, Maine and Massachusetts, Most Recent Study Period	100
5-20	EAC-Related Savings: Total Savings Based on Cost Per Unit and Cost Per Prescription, Maine and Massachusetts	101
5-21	MAC Program Costs to the Federal Government	102
5-22	Summary of State Costs Associated with Federal MAC Program	106
5-23	Pharmacy Participation in Maine	110

LIST OF TABLES
(continued)

<u>Table</u>		<u>Page</u>
5-24	Pharmacy Participation in Tennessee	112
5-25	Per-Unit Market Shares, Librium and Darvon	113
5-26	Estimated Pharmacy Losses on Librium and Darvon	115
5-27	Ataractic Tranquilizers, Minnesota, April 1975 - September 1979	119
5-28	Non-Narcotic Analgesics, Maine, April 1975 - September 1979	120
5-29	Models of the Manufacturers' Price Response	124
6-1	Variable Definitions	132
6-2	Structural Equation Specifications	135
6-3	Structural Equations	145
6-4	Reduced Form Equations	148

LIST OF EXHIBITS

<u>Exhibit</u>		<u>Page</u>
4-1	Geographic Distribution of State MAC Programs 1978	49
4-2	States with Monthly Limits on the Number or Dollar Amount of Prescriptions in 1978	50
4-3	States with Open and Closed Formularies in 1978	56

1.0 INTRODUCTION: OVERVIEW AND SUMMARY

This study is a pilot or "first generation" evaluation of the Maximum Allowable Cost (MAC)/Estimated Acquisition Cost (EAC) program, the federal government's cost containment program for prescription drugs. Based on proposals of the Task Force on Prescription Drugs and the example of various state programs, HEW Secretary Caspar Weinberger first proposed the MAC-EAC regulations in December 1973. After two years of consideration and substantial controversy, the regulations became effective on August 26, 1976. As written, they actually have four major components: (i) Maximum Allowable Cost (MAC) reimbursement limits for selected multisource or generically available drugs; (ii) Estimated Acquisition Cost (EAC) reimbursement limits for all drugs; (iii) "usual and customary" reimbursement limits for all drugs; and (iv) a directive that professional fee studies be performed by each state.

Because of wide variability in market prices for the same manufacturer's products and a presumed lack of competition, especially in the absence of widespread price advertising, state Medicaid programs have traditionally sought to reimburse prescriptions at cost. Furthermore, they have taken a "value-added" approach in doing so, setting reimbursement equal to the ingredient cost plus the estimated cost of actually dispensing the product--what is called the dispensing fee. The Maximum Allowable Cost (MAC) provision takes advantage of the price differentials between brand name products and their lower-priced generic competition; it limits ingredient cost reimbursement to the lowest price at which a generically-available drug is "widely and consistently" available. The Estimated Acquisition Cost (EAC) portion of the program limits ingredient cost reimbursement to the pharmacy's estimated acquisition cost. The regulations state that the "estimated

acquisition cost" should be "the State's closest estimate of the price generally and currently paid by providers." Whereas pre-EAC ingredient cost reimbursement levels were thought to be too high, it was also suggested that dispensing fee levels were too low. Consequently, in response to this concern, the MAC-EAC regulations also required that the states conduct cost studies and establish reasonable cost-related fees. Finally, the "usual and customary" provision constrains reimbursement to be no greater than the pharmacy's usual and customary charge to the general public--i.e., the price that a nongovernment-reimbursed customer would be charged for the prescription. Allowable reimbursement under the MAC-EAC program is thus the lowest of the following: (1) the MAC reimbursement limit (if any) plus the dispensing fee, (2) the EAC reimbursement limit plus the dispensing fee, and (3) the usual and customary charge to the general public.

Between September 1976 and February 1978, MAC reimbursement limits were placed on 15 dosage forms of five multisource chemical entities:

- ampicillin,
- chlordiazepoxide HCl (Librium),
- penicillin VK,
- propoxyphene HCl (Darvon), and
- tetracycline.¹

Although MAC reimbursement limits have also been set on 37 dosage forms of 20 additional chemical entities, this study only examines the experience through mid-1979 with the initial five MAC products listed above. Furthermore, because of data limitations and resource constraints, the study

¹These five products jointly account for about five percent of total prescription drug sales.

primarily relies upon Medicaid data in a sample of five states to identify program effects.¹ Extensive drug usage and reimbursement data were collected from the Medicaid programs in Arkansas, Maine, Massachusetts, Minnesota and Tennessee; and these data were examined for MAC- and EAC-related changes in cost and prescription patterns over time. In addition, the costs of administering the MAC-EAC program were estimated, not only in the five study states but also at the federal level. A time series of more aggregate state drug program data was also compiled for cross section/time series econometric analysis. This multivariate study was helpful in generalizing EAC-related results from the sample states to the nation as a whole. However, methodological and data problems precluded econometric estimation of MAC-related effects. Also, as part of this study, the state Medicaid programs were surveyed in order to prepare a profile of state drug program characteristics for use in the multivariate analysis.²

The study was conducted in two phases. In Phase I, the profile of state programs was prepared, and the evaluation methodology was developed and tested in one study state (Massachusetts). In Phase II, data were collected from the four other study states and all analyses completed.

1.1 Findings

The MAC-EAC program is generally motivated by a concern about the lack of competitive conditions in the drug industry, especially patterns of wide and seemingly inexplicable variation in drug prices. Whereas it is assumed that the total or societal benefits of the program will exceed the

¹ In 1978 Medicaid payments for prescription drugs amounted to \$1.1 billion, about six percent of total Medicaid benefit expense.

² MAC-related effects on manufacturers price levels were also investigated.

total costs, it was not possible in the context of this study to reliably measure, much less value all potential benefits and costs of the MAC-EAC program. The study necessarily focuses on the testing of more limited or partial hypotheses. In particular, it is primarily concerned with determining the reimbursement cost-savings potential--i.e., whether or not the reimbursement savings exceed incremental administrative costs, and by how much. Key findings with respect to this hypothesis are presented in Tables 1-1 and 1-2 for the five study states. Inasmuch as the MAC- and EAC-parts of the MAC-EAC program could, in principle, have been implemented separately, separate estimates are given for the cost-savings potential of each.² Although the estimated reimbursement savings and state administrative costs were obtained directly from the study states, the federal administrative costs and the increase in dispensing fee reimbursement were estimated at the national level and are merely apportioned or prorated to the five state sample. We believe that such allocation is generally more dependable than extrapolating the state level estimates to the nation.

1.1.1 MAC-Related Savings

As seen in Table 1-1, MAC-related reimbursement savings on the initial five MAC products amount to more than \$900,000 per year in the five study states. This is nearly one percent of total Medicaid drug reimbursement expense in these states. If the same level of savings is achieved by Medicaid drug programs in other states, almost eleven million dollars per year would be saved nationwide on the first five MAC products

¹For practical purposes, the "EAC-part" is understood to also include the usual and customary reimbursement limit and the dispensing fee mandate provision.

Table 1-1

MAC-RELATED SAVINGS ON FIVE PRODUCTS AND THE MAC-RELATED COSTS
IN FIVE STUDY STATES, ANNUAL PROJECTIONS, 1979

State	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	TOTAL
(1) MAC-Related Savings on Five Products ¹	\$220,928	\$89,786	\$203,710	\$100,456	\$310,816	\$925,696
(2) Incremental State Administrative Costs	700	0	0	9,268	0	9,968
(3) Prorated Share of Federal Administrative Costs	5,086	2,282	8,976	5,976	9,223	31,543
(4) Net Savings [(1)-(2+3)]	215,142	87,504	194,734	85,212	301,593	884,185
(5) Reduction in Federal and State Income Taxes [.184(1)]	40,651	16,521	37,483	18,484	57,190	170,328
(6) Net Governmental Savings [(4)-(5)]	174,491	70,983	157,251	66,728	244,403	713,857

¹Ampicillin, chlordiazepoxide HCl, penicillin VK, propoxyphene HCl and tetracycline HCl.

Table 1-2

EAC-RELATED SAVINGS AND COSTS IN FIVE STUDY STATES, ANNUAL PROJECTIONS, 1979

State	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	TOTAL
(1) EAC-Related Savings	\$ 0	\$300,274	\$2,022,294	\$ 0	\$ 0	\$2,322,568
(2) Prorated Share of Federal Administrative Costs	NA	NA	NA	NA	NA	31,543
(3) Estimated Increase In Dispensing Fees	NA	NA	NA	NA	NA	2,796,663
(4) Net Savings [(1)-(2+3)]	NA	NA	NA	NA	NA	(505,638)

alone.¹ As is also shown in Table 1-1, the incremental state costs of administering the MAC-part of the MAC-EAC program are quite modest, virtually insignificant in four of the five study states but amounting to \$10,000 per year in Minnesota.² On the other hand, the federal costs of implementing and operating the combined MAC-EAC program totaled just under three million dollars for the five-year interval between 1975 and 1979. About 60 percent of this amount was spent on MAC program staff and FDA staff activity. The remainder is primarily attributable to the cost of data-related contracts. Although it was not possible to distinguish between implementation and operating costs, total program costs appear to be stabilizing at about \$700,000 per year. However, we judge that only half of this annual expense is MAC-related, i.e., about \$350,000 per year. Apportioning this annual cost on the basis of drug program size, the prorated share of the five study

¹The estimated rates of reimbursement savings in the five states range from 0.54 percent of drug program cost in Minnesota to 1.40 percent of the cost in Arkansas. Using this range of estimates, the savings achieved nationwide would range between six and fifteen million dollars.

²Although not shown in either Table 1-1 or Table 1-2, the one-time state costs of originally implementing the MAC-EAC program were somewhat larger, averaging about \$22,000 per state:

Arkansas	\$47,952
Maine	11,600
Massachusetts	15,000
Minnesota	12,491
Tennessee	22,000
	<hr/>
	\$109,043

However, only a small percentage of implementation costs could be said to be MAC-related. The largest part of these costs, almost 75 percent, were incurred in conducting the mandated dispensing fee surveys. Such implementation costs are "sunk costs" at this point, and as an allocational matter, are irrelevant for evaluating whether or not the MAC-EAC program should be continued. Furthermore, neither the state nor the federal implementation costs were so large as to dominate a long-run evaluation of the program. If, for example, the state implementation costs were amortized or depreciated over a 30-year period, the allocated expense would amount to less than \$4,000 per year.

states amounts to approximately \$31,000 per year. Thus, as we see in Table 1-1, the net MAC-related reimbursement savings--i.e., the reimbursement savings net of administrative costs--for the initial five MAC products still amounts to almost \$900,000 per year in the five study states. The implicit benefit-cost ratio is 22 to 1.¹

The savings in drug reimbursement might also be offset by the reduction in tax revenue to federal, state and local governments. If we take account of such tax loss, the net governmental savings amounts to something more than \$700,000--for a benefit-cost ratio of 17 to 1. However, it is not clear that the tax loss is a cost that should be attributed to the program. Taxes are merely transfer payments within the society-at-large and do not constitute a real cost from the taxpayer's perspective.

Finally, the reader is reminded that the MAC-related reimbursement savings measured in this study merely represent the "tip of the iceberg." We only estimate the reimbursement savings associated with the initial five MAC products, whereas MAC reimbursement limits have now also been set on 20 additional products. Furthermore, the number of multisource products available for MAC reimbursement will increase sharply in the near future, as bioequivalency standards are met by additional multisource products and more sole-source products go off patent.¹

1.1.2 EAC-Related Savings

As seen in Table 1-2, EAC-related reimbursement savings in the five study states amount to about \$2.3 million per year. However, these savings were achieved in only two of the five study states, Maine and Massachusetts.

¹By 1981, 117 of the top 200 products will be off patent.

The Medicaid programs in Arkansas, Minnesota and Tennessee have not changed their drug reimbursement programs in response to the EAC requirement. Whereas the standards for assessing EAC compliance are somewhat unclear, the pre-existing approaches to determining ingredient cost reimbursement in Minnesota and Tennessee appear to satisfy the EAC requirement. However, the current approach to ingredient cost reimbursement in Arkansas probably does not satisfy the requirement. Thus, additional EAC-related savings may eventually be achieved in Arkansas.

Neither Maine nor Massachusetts, the two states that responded to the EAC requirement, are incurring additional administrative costs due to the EAC-related changes in drug reimbursement.¹ The newly-adopted approaches to establishing ingredient cost reimbursement limits in these two states are neither more nor less expensive than the approaches they replaced. However, we estimate that the Federal expense of administering and supporting the EAC-part of the MAC-EAC program is currently about \$350,00 per year. Once again apportioning the Federal expense on the basis of program size, the prorated share of the five study states is \$31,000 per year. Inasmuch as it did not seem appropriate to explicitly allocate such expense to states unaffected by the EAC requirement, state-specific estimates are not given in Table 1-2.

We have also attributed (see Table 1-2) an extraordinary increase in dispensing fee reimbursement to the EAC-part of the program. The average per-prescription dispensing fee has increased over the five-year study interval as shown below:

¹ However, as discussed in the footnote on page 6, the states did incur some expense of time of implementation.

	<u>Year</u>	<u>Average Fee</u>	<u>Change</u>	<u>% Change</u>
Pre-EAC	1974	\$1.96	+8¢	+4.08%
	1975	2.04	+7¢	+3.43%
	1976	2.11	+17¢	+8.06%
Post-EAC	1977	2.28	+17¢	+7.45%
	1978	2.45		

In the two years prior to EAC, the average dispensing fee increased at the rate of 3.76 percent per year. However, in the two years subsequent to EAC, the average fee has increased at the rate of 7.76 percent per year. The greater post-EAC rate of fee increase, due no doubt to the mandate for reassessment of dispensing fees, implies that the average fee in 1978 was 17.2¢ higher than if the pre-EAC trend had continued.¹ Whereas it is not altogether clear that the full amount of this fee differential should be attributed to EAC (e.g., fee surveys may have simply catalyzed the adjustment of long-run disequilibrium problems and fee increases might have been forthcoming anyway), we believe that it is most reasonable to do so.² When the full amount of the fee differential is attributed to the program, it represents an extraordinary \$2.8 million increase in dispensing fee reimbursement

¹This estimate is consistent with that obtained from the econometric analysis. After controlling for other relevant differences (e.g., wage levels and recipient characteristics), dispensing fees were estimated to increase unexpectedly by 17.6¢ per prescription in 1978.

²Since the post-EAC rate of fee increase is still no greater than the rate of increase in the drug consumer price index, it has been suggested that the fee increases observed merely reflect underlying inflation in the economy. We tend to discount this argument for two reasons. First, one would also have expected the pre-EAC rate of fee increase to parallel the inflation rate. Secondly, for exogenous reasons, the market is shifting toward higher volume, lower cost pharmacies--e.g., the chains are expanding and "corner" drug stores are closing. That is, we have reason to believe that input price inflation is being substantially offset by efficiency gains.

for the five study states alone. This implies that the EAC-part of the program is actually incurring a net loss, equal to about half a million dollars per year in the five study states.¹ This general finding--namely, that no significant savings have been achieved by EAC--was supported from econometric analysis of the aggregate drug reimbursement experience in all states. However, we also indicate caution with respect to the econometric finding since the data problems and limitations were severe.

The above finding tends to support a hypothesis put forward by program critics, namely, that there was simply no money to be saved by the EAC-provision of the MAC-EAC program. It had been argued that pre-EAC price levels fairly reflected the costs of doing business and that EAC-related savings in ingredient cost reimbursement would be offset by increases in dispensing fee reimbursement. Whereas current evidence is clearly consistent with that hypothesis, it is premature to either accept or deny it on the basis of the more idiosyncratic EAC experience in just five states. However, even if EAC is not found to save money, such finding would not preclude favorable evaluation of the EAC provision. To the extent that EAC rationalizes pharmacy reimbursement, by setting reimbursement limits that more nearly reflect the differential costs of different prescriptions, it furnishes more appropriate price incentives and may lead to a more efficient allocation of resources in the long-run.

¹ It would be altogether inappropriate to offset any portion of the estimated increase in dispensing fee reimbursement against the reimbursement savings due to the MAC portion of the MAC-EAC program. Whereas EAC-related savings were to be achieved primarily at the expense of the pharmacies themselves, MAC-related savings were to be achieved primarily at the expense of pharmaceutical manufacturers. Thus, unlike EAC, there is little or no reason to hypothesize a causal relationship between dispensing fee levels and the forcing of generic substitution for public-paid prescriptions.

1.1.3

Other Findings

Among other MAC- and EAC-related findings from the study were the following:

- No evidence was found that pharmacy participation rates have fallen in response to the MAC-EAC program. However, reliable information for pharmacy participation could only be obtained in two study states, Maine and Tennessee.
- A significant percentage of the prescriptions for propoxyphene HCl and chlordiazepoxide HCl were still being filled with the higher-priced brand. Thus, part of the MAC-related savings are temporarily coming from pharmacy losses.
- No evidence was found for MAC-related shifts toward prescribing of sole source, therapeutically-equivalent substitutes for the MAC products. Nevertheless, it appears that non-MAC products are gradually being substituted for at least some of the MAC products over time and that MAC-related reimbursement savings may thereupon also be expected to decline over time.
- Brand-necessary overrides were not a significant factor in any of the study states except Minnesota. Although Minnesota does not have a mechanism for monitoring for identifying overrides, about 22 percent of the chlordiazepoxide prescriptions were reimbursed at the brand-name (Librium) price level.
- Some evidence was found that manufacturers of the higher-priced brands of the MAC products have reduced their prices in response to the MAC program. There was also some, albeit a much less strong indication that the manufacturers of lower-priced brands have increased their prices to the MAC level and that manufacturers have increased price levels on sole-source substitutes.

The following findings come from the econometric study.

- Selected EAC-type reimbursement limits--local wholesale, direct and federal decile--were found to be associated with significantly lower prescription reimbursement levels.
- Usual and customary reimbursement limits were estimated to reduce reimbursement by 27¢ per prescription.
- Substitution laws were found to reduce reimbursement by 33¢ to 37¢ per prescription.
- Closed formularies were estimated to reduce reimbursement by 32¢ per prescription.
- The results generally affirm the cost-savings potential of other types of program restrictions, especially co-payments.

1.1.4 General Conclusions

There should no longer be much doubt about the cost-savings potential of the MAC portion of the MAC-EAC program. The fledgling first-efforts of the MAC program are clearly shown to have saved substantial amounts in the five study states and we have no reason to believe that experience elsewhere will be much different. The MAC program has achieved significant savings, and as the number of drug products affected by the MAC program increases, the savings will continue to grow. We believe that continuing discussions of the MAC-EAC program might focus more fruitfully on the potential externalities, e.g., the potential downstream impact of diminished industry profit levels on R&D activity and new drug development.

The cost-savings potential of the EAC portion of the MAC-EAC program is considerably less certain. Our results tend to indicate that EAC-related savings in ingredient cost reimbursement are offset by EAC-related increases in dispensing fee levels. However, it is premature to draw any strong conclusions on the basis of the more idiosyncratic EAC experience in just five states. In any event, the use of actual cost data to estimate ingredient cost and pharmacy dispensing costs levels provides a more rational mechanism for establishing reimbursement levels. Even if the EAC program has not generated net cost savings in the short-run, less tangible benefits may accrue to the program in the longer-run.

1.2 Organization of the Report

The remainder of the Report is organized as follows: Section 2.0 presents background information on the MAC-EAC program; section 3.0 develops evaluation hypotheses in the context of a conceptual discussion; section 4.0 describes the survey of Medicaid drug programs; section 5.0 presents the study states analyses; and section 6.0 reports on the econometric study.¹

¹ MAC-EAC evaluation literature is reviewed in Appendix A.

2.0

BACKGROUND

In considering the MAC-EAC program, it is useful to consider the workings of the drug industry, the impetus for the program, and the circumstances that made the program possible.

2.1

Overview of the Drug Industry

In 1976, the national expenditure for drugs and related products was approximately \$11.2 billion--see Table 2-1. Of this amount, the combined federal, state, and local government drug expenditures was about \$3.4 billion, or 30 percent of the total. About \$2.0 billion or 59 percent of this amount is estimated as "product" or ingredient cost, with the remainder representing pharmacy "overhead" or dispensing cost.

Table 2-1

National and Government Drug Expenditures in FY 1974
and Projections for FY 1976

	<u>1974</u>	<u>1976</u>
National	\$9,695	\$11,168
Government	2,980	3,373
HEW	1,593	1,803
DOD	154	174
VA	93	105
Other Federal (AID, HUD, OEO, and others)	62	70
State and Local	991	1,121

Source: Thomas R. Fulda, "Prescription Drug Data Summary, 1974" DHEW/SSA, Office of Research and Statistics, various tables.

The primary source of drug products in the U.S. is the domestic drug industry; imports represent only a small fraction of the total market. Domestic manufacturer sales in 1978 amounted to \$9.4 billion, and were growing at an annual rate of eight percent. Direct manufacturer sales were distributed as follows in 1978: about 51.4 percent went to wholesalers, 22.8 percent to retail pharmacies, 22.6 percent to hospitals, and about three percent to others. Wholesalers in turn distribute to retail pharmacies, hospitals, and other health institutions, marking up the cost to some extent--the markup depending on the customer, the drug, the volume purchased, and other factors. Manufacturers' pricing and distribution policies differ; some sell only through wholesalers, and others sell directly to retail pharmacies. Of course, direct prices are generally lower than wholesaler prices. Departures from published wholesale or direct list prices are common as a result of special deals, free goods, quantity discounts and year-end rebates. These factors have led to substantial difficulty in developing equitable reimbursement levels for prescription drugs under federally financed programs. Furthermore, the prices charged to hospitals and other large-volume purchasers tend to be substantially less than list price due to competitive procurement practices and their greater willingness to accept lower-priced therapeutic substitutes.

There are approximately 300 major wholesale firms, 55,000 retail pharmacies, and 7,000 hospital pharmacies. In 1978, about 1.4 billion prescriptions were dispensed, down almost seven percent from the 1.5 billion prescriptions in 1975. About 65 percent of prescriptions are filled on an outpatient basis in retail pharmacies, the remainder being dispensed to patients in hospitals and other institutions. The number of independent retail pharmacies has been declining for several decades and about 25 percent

of the pharmacies are now owned by chains. Competition from chains and lower profit margins have forced the closure of many independents. In 1972, independent pharmacies filled 66 percent of retail pharmacy prescriptions and chain stores filled the remaining 34 percent. By 1975, the market share of independent stores had dropped to 59 percent and that of chains had grown to 40 percent. In 1975 the average prescription price in an independent store was \$5.01, while the chain store had an average price of \$4.79.

Average prescription prices have increased from \$3.86 in 1969 to \$5.20 in 1975, and to \$6.44 in 1978--reflecting not only increases in the cost of the product to the retailer but also new product introductions, substantial growth in the average prescription size and higher pharmacy operating costs (e.g., labor, inventory-carrying charges and rent). After adjusting for changes in prescription size and new product introductions, the Firestone Index indicates that prescription prices increased at an average annual rate of only three percent per year between 1970 and 1978.

New drug products emanate primarily from the laboratories of large drug manufacturers.¹ These products may be new chemical entities, variations and combinations of existing substances, or new dosage forms. Introductions of new drugs are largely controlled by the U.S. Food and Drug Administration (FDA). In 1960, there were 50 new single-entity drug product introductions; in 1978, 23 new products were introduced.

New products are granted patent protection for 17 years. Products still under patent protection are available only from the discoverer and are termed "single source" drugs (e.g., Aldomet, Keflex). Drugs available from

¹Approximately six percent of every major manufacturer sales dollar is spent on research and development--of which ten percent goes for basic research and 90 percent goes for applied research.

more than one supplier, usually due to patent expiration, are termed "multi-source" drugs. "Branded" products are simply those marketed under a proprietary trade name rather than the product's generic name--e.g., "Darvon" is Lilly's brand name for propoxyphene HCl.

Upon introduction, many products are priced high to recover research costs during the first three years that the product is on the market. Afterwards, the price tends to be constant or decreasing, depending on the availability of therapeutic substitutes. Once patent protection has ended, the price either remains fairly constant or decreases dramatically, depending on the firm's ability to maintain the product's dominance against generic competition. Prices for older products have generally "bottomed out", and tend to increase slowly over time.

In most instances, the first firm to introduce a product tends to be the price leader. Other entrants into the market normally price their product at or below the leader's price. The smaller generic manufacturers tend to set their prices well below the prices of the leading brands, whereas other major manufacturers tend to price their generic and "branded generic" lines somewhere in between.

2.2 Antecedents of the MAC-EAC Program

It has long been known that substantial variations exist in the prices charged by different pharmacies for the same prescription and that substantial variation exists in the prices charged by different manufacturers of the same product. Hearings by the late Senator Estes Kefauver (1959-1962) and subsequently by Senator Gaylord Nelson (1967-1970) brought this situation to the public's attention. While they and others proposed actions to take advantage of these price differentials, the first comprehensive proposal for cost control in government reimbursement programs was developed by the

Task Force on Prescription Drugs (1969). The Task Force--organized to consider the desirability of including drug benefits in Medicare--recommended a variety of mechanisms for "controlling" the costs of a drug benefit program, including "maximum allowable cost" (MAC) and "actual acquisition cost" (AAC) reimbursement limits. The AAC concept was a forerunner of EAC. Whereas EAC limits ingredient cost reimbursement to an estimate of what the average pharmacy paid for the product, AAC would have limited reimbursement to the amounts that each pharmacy actually paid for the product. Although an AAC-type approach was initially considered, it was ultimately rejected as being too burdensome and too difficult to administer.

Whereas administrative feasibility was the principal concern with respect to AAC, and subsequently EAC, the substantive concerns and requirements for a MAC program were much greater. The most important of these was the following. The major pharmaceutical manufacturers argued--and some still argue--that lower-priced generic drugs are not equivalent to their own "brand name" drugs. They contended that the generic drugs were not as safe and that a physician could not be sure of obtaining equivalent pharmacological or biological action with generic drugs. Indeed, there was some validity to this argument as late as the early 1970's. However, the quality/bioequivalence argument has now lost much of its merit, both because of the entry of major companies into the generic market and the FDA's development of revised Good Manufacturing Practice (GMP) requirements and bioavailability regulations. The bioavailability regulations, first proposed in 1975 and made final on January 7, 1977, required that the FDA assure the bioequivalence or bioavailability of generically-available drugs.

Directly related to the quality issue was one of substitution. With equivalence not considered a major problem, state legislatures no

longer saw the need for anti-substitution legislation--i.e., legislation prohibiting the pharmacist from dispensing a generic substitute instead of the "brand name" product actually prescribed. At the time of this writing, 43 states and the District of Columbia have adopted laws permitting pharmacists to dispense a chemically-equivalent drug product for a drug prescribed by trade name. Nineteen states have positive formularies (i.e., lists of drugs deemed equivalent and interchangeable), and twelve states have negative formularies (i.e., lists of drugs deemed not equivalent and not substitutable). All states have some provision for allowing a physician to override substitution. Substitution and, concomitantly, generic prescribing have also become more acceptable to the general public.

Of course, another precondition for MAC was simply one of having drugs available to substitute--the greater the number of multisource drugs, the greater the opportunity to achieve savings. In 1969 and the early 1970s, practically all major drugs enjoyed patent protection. This situation has now changed dramatically. From 1975 to 1980, drugs with sales amounting to \$1.1 billion in 1974 lost patent protection (see Table 2-2) Furthermore, of the top 200 drugs in 1975, 117 would lose patent protection by the end of 1981.

Table 2-2

SALES OF DRUGS AND PATENT EXPIRATIONS
(\$ in Millions)

	<u>Total Sales 1974</u>
Patent Expired Prior to 1975	\$1,210
Patent Expirations:	
1975	45
1976	211
1977	123
1978	103
1979	225
1980	387
after 1980	933
 Total	 \$3,237

Source: Halsey, Stuart & Company, Inc., "MAC, Maximum Allowable Cost, Price Limitations in Government Financial Drug Programs" (New York, October 16, 1975), p. 11.

While scarcely a necessary condition, the early example of several state programs was no doubt a significant impetus to adoption of the federal MAC program. In 1961, under the Public Assistance Medical Care Program (the forerunner of Medi-Cal), California established "maximum allowable wholesale cost" limits for ten multisource drugs; and this program continued with the advent of Medi-Cal in 1966. In 1972, Medi-Cal expanded the program to 198 additional multisource drugs. One unusual feature of this program was that manufacturers whose drug prices exceeded the reimbursement limits could refund the difference to the state and assure full reimbursement of the pharmacists for their products. This approach was successfully challenged in court, and in 1973 its successor the Maximum Allowable Ingredient Cost (MAIC) was implemented. Another important early MAC program was one implemented by Tennessee in 1972.

These various strands come together in the federal MAC program. There were successful MAC programs in several states; there was also the repeal of substitution legislation and the drive for generic prescribing; the controversial quality issue had been allayed by the FDA commitment to ensuring equivalency; and there was also the general atmosphere of greater cost control in government-funded health programs, reinforced by the "prudent buyer" clause of the Social Security Amendments of 1972.¹ Thus, based on the proposals of the Task Force on Prescription Drugs and the example of various state programs, then HEW Secretary Casper Weinberger, in December 1973, first proposed the federal MAC regulation. After two years of consideration and substantial controversy, they were finalized on July 25, 1975.

2.3 The MAC-EAC Regulations and Their Implementation

As written, the regulations have four major components: Maximum Allowable Cost (MAC) reimbursement limits for multisource drugs; Estimated Acquisition Cost (EAC) reimbursement limits for all drugs; "usual and customary" reimbursement limits, and a directive that professional fee studies be performed by each state program. A discussion of each follows, with fee studies being subsumed under the EAC provision.

2.3.1 MAC

Because of wide variability in market prices for the same manufacturer's products and a presumed lack of competition, especially in the absence of widespread price advertising, state Medicaid programs have traditionally sought to reimburse prescriptions at cost. Furthermore, they have taken a "value-added" approach in doing so, setting reimbursement equal to

¹The "prudent buyer" clause limits allowable reimbursements to the amount that a prudent and cost conscious buyer would pay.

the ingredient cost plus the estimated cost of actually dispensing the product--what is called the dispensing fee. The central purpose of the Maximum Allowable Cost (MAC) provision was to take advantage of the price differentials between brand name products and lower-priced equivalents, paying only for the less expensive version and thereby realizing a savings. It limits ingredient cost reimbursement to the lowest price at which a multi-source product is available. A MAC reimbursement limit can be established for any multisource drug for which substantial amounts of federal funds are or may be expended, and for which prices vary widely. In addition, the program has other, less explicit purposes. One is to encourage substitution and generic prescribing. Another MAC goal was to promote price competition in the multisource market.

In establishing a MAC limit, the federal Pharmaceutical Reimbursement Board (PRB) first identifies candidate multisource drugs, determines "the lowest unit price at which the drug is widely and consistently available from any formulator or labeler", and determines the potential savings to the government from setting the reimbursement limit. Once a drug has been initially identified, the FDA Bureau of Drugs advises the Board

"whether there is any regulatory action, either pending or under consideration, bearing upon the marketability or the establishment of bioequivalence that in the judgement of the FDA may be a reason for delaying or withholding the establishment of a MAC for a drug."

Following FDA approval of the drug, the Board convenes a public hearing, and based on the hearing, the Board makes the final decision.

Between September 1976 and February 1978, MAC reimbursement limits were placed on 15 dosage forms of five chemical entities. Between February 1978 and October 1980, the PRB established similar reimbursement limits on 20 chemical entities, including 37 different dosage forms. It has also lowered some earlier limits.

2.3.2 EAC

The Estimated Acquisition Cost (EAC) portion of the MAC-EAC program limits ingredient cost reimbursement to the pharmacy's estimated acquisition cost. Specifically, the regulations say that the EAC should "be the State's closest estimate of the price generally and currently paid by providers. Such estimates shall be based on the package size most frequently purchased by providers." To aid the states in developing such estimates, the PRB makes available information on the distribution of actual acquisition costs. Under contract with IMS America, HCFA obtains and disseminates information on the invoice prices paid for drugs in a sample of 1,000 pharmacies. For the 300 most frequently purchased chemical entities and the most frequently purchased dosage forms and strengths, decile prices are provided. These data are merely supplied to the states as a guide, and it is the responsibility of each state Medicaid program to develop a reimbursement approach that complies with the EAC requirement.

Prior to EAC, Average Wholesale Prices (AWP)--the average of wholesalers' listed prices--were often taken as the basis for ingredient cost reimbursement. However, because some pharmacies purchased directly from manufacturers and because of various kinds of purchasing discounts, the actual prices paid by pharmacies were estimated to be 15-18 percent less than the listed wholesale prices. Ingredient cost reimbursement levels were thus thought to be too high. However, it was also suggested that dispensing fee levels were too low. Thus, the MAC-EAC regulations also required that the states conduct cost studies and establish reasonable cost-related fees.

In establishing the dispensing fee, States should take into account the results of surveys of costs of pharmacy operation. States shall periodically conduct such surveys of pharmacy operational data including such components as overhead, professional services and profits.

2.3.3 Usual and Customary

The "usual and customary" provision constrains reimbursement to be no greater than the pharmacy's usual and customary charge to the general public--i.e., the price that a nongovernment-reimbursed customer would be charged for the prescription. Obviously, the government does not wish to pay more for prescriptions than does the general public. Unfortunately, little is known about how the states ensure compliance with this requirement.

To conclude, allowable reimbursement under the MAC-EAC program is the lowest of the following: (1) the MAC reimbursement limit (if any) plus the dispensing fee, (2) the EAC reimbursement limit plus the dispensing fee, and (3) the usual and customary charge to the general public.

3.0

STUDY HYPOTHESES AND CONCEPTUAL PERSPECTIVE

The purpose of this section is threefold: to explain the MAC program conceptually, to model the behavior of various actors in the context of the MAC program, and to develop hypotheses concerning the cost and other effects of the MAC program. It should be noted that this theoretic discussion is far-ranging and goes beyond the more limited set of hypotheses that can be tested within the limitations of this study.

Furthermore, the hypotheses are developed in somewhat informal fashion. It was felt that a more formal theoretical model was not appropriate, that none could claim general acceptance in representing oligopolistic-type markets and that none could adequately abstract all the relevant behavioral dimensions of the MAC program. We have rather sought to give an understanding of the behavioral environment that can be understood by economists and non-economists alike, one that conforms reasonably well to a general perception of what's happening in the "real world."

As already stated, the MAC-EAC program is motivated by a general concern over the apparent lack of competitive conditions in the drug industry, especially the pattern of wide and seemingly inexplicable variation in drug prices. The underlying assumption of the MAC-EAC program is that:

The societal benefits of the MAC-EAC program exceed the societal costs.

While one would like to test that hypothesis, it was not possible to reliably measure, much less assign a value to all the potential benefits and costs of the program. Thus, the study must necessarily focus on the testing of more limited or partial hypotheses.

3.1

Hypotheses Concerning the Impact on the Government:

The primary hypothesis tested in this study is that:

The governmental benefits of the MAC-EAC program exceed the governmental costs--i.e., that the savings in reimbursement cost will exceed the administrative and other program-related costs.

Although the MAC-EAC program applies to both inpatient and outpatient drug programs, the potential for discovering a measurable impact in the hospital setting was slight. Hospitals tend to use competitive bidding in purchasing drug products and almost always purchase drug products at prices below any MAC or EAC reimbursement limits. Thus, only prescriptions dispensed by retail pharmacies are directly affected by the MAC-EAC program. The principal government-reimbursement programs having drug coverage are Medicare, Medicaid, and the Public Health Service programs. Medicare only reimburses for prescriptions dispensed to patients in hospitals and long-term care facilities. Furthermore, whereas Public Health Service programs encompass ambulatory drug benefits, the programs are comparatively small. Consequently, the out-patient Medicaid program will reflect the largest part of any governmental cost savings due to the MAC-EAC program.

3.2 Hypotheses Concerning the Impact on Drug Manufacturers

The pharmaceutical manufacturing industry is commonly portrayed as a price-discriminating, oligopolistic industry in which advertising or promotion is used extensively to differentiate the products, by focusing on minor differences between products and thereby avoiding price competition. The marketing of "brand name" drugs in a generic market can be seen as an extreme case of such product differentiation. The manufacturer typically dwells on therapeutically irrelevant differences (e.g., taste, packaging, and dosage form) but, more importantly, emphasizes its more stringent manufacturing and quality standards. A physician, acting as consumer agent for his patients, cannot easily assess whether or not such "quality" differences are therapeutically significant--i.e., whether or not the quality issue

is even relevant. Thus, a physician may understandably prescribe a higher-priced brand name product to protect his patients from any potential risk entailed by taking a possibly lower-quality generic equivalent. The physician "trusts" the manufacturer, either on the basis of satisfactory experience with the manufacturer in the past or on the basis of the manufacturer's general reputation, visibility, and exposure to scrutiny.¹

The central tenet of MAC reimbursement is that all products within certain generic classes are therapeutically equivalent, as attested by the Food and Drug Administration (FDA), and therefore that product selection for government patients can be made solely on the basis of price. That is, except for certain dosage forms, non-price differences within generic class are deemed to be irrelevant. The government limits reimbursement of ingredient cost to the level of the lowest-price generic alternative that is "widely and consistently available from any formulator or labeler." To the extent that these low-price generic equivalents are in fact stocked by pharmacies prior to MAC implementation (i.e., are widely and consistently available from the providers), the government is merely choosing, as a prudent buyer, to purchase the lowest price version of what it perceives to

¹ Brand name familiarity is an additional factor that may explain lack of price competition in generic markets. The chemical or generic names are typically lengthy and unpronounceable, whereas brand names are by design more tractable and memorable, in addition to being more prominently exhibited in promotion of brand name products. Furthermore, multisource drugs are largely known and prescribed by brand name while still under patent and tend afterwards to be referred to by brand name when the generic class is meant, in much the same way as "Kleenex" is used to refer to tissue paper and "Scotch" tape is used in reference to cellophane tape. In fact, a study by Horvitz, Morgan, and Fleckenstein found that physicians could correctly identify only 14 drugs out of 22 as having a generic alternative. This informational problem is apparently less characteristic of pharmacists. The FTC report Drug Product Selection concluded after reviewing four studies on the subject that, "Separately, these studies may not be conclusive, but their consistant findings indicate that although pharmacists' knowledge is not perfect, they are more competent than MDs in drug product selection."

be a homogenous commodity.¹ As such, the government is not exercising any incremental market power, given the cost-plus-fee basis for reimbursement.² However, to the extent that the low-price generics were not formerly available, the government is exercising at least some additional market power.³ In such cases, participating pharmacies would either have to dispense a higher-cost product at the lower reimbursement level or incur additional inventory and other transaction expense in stocking the lower-cost product.

In any event, the key hypothesis concerning the impact of MAC on the drug manufacturers is that:

MAC reimbursement policies will lower overall profitability or net earnings in the pharmaceutical industry

The MAC provision is seen as a pro-competitive force and might be said to reduce "excess profits" within the industry. This assumes the brand name

¹ The MAC concept depends to a large extent upon the existence of "workable competition" in the drug market (i.e., that normal market forces can be relied upon to determine MAC price levels). Consequently, the MAC program is not, as some have suggested, a viable model for cost containment under national health insurance. A competitive market would cease to exist if all multisource drugs were reimbursed under a MAC-type arrangement. Reimbursement price levels would necessarily have to be determined by a competitive bidding process. However, this does not preclude the application of the "maximum allowable cost" price-limiting approach to reimbursement of other health care services provided to public patients (e.g., eye glasses).

² This would not be true if the pharmacy "profit margin" on ingredient cost--EAC or MAC minus AAC--were higher on the brand name product than on the generic.

³ Although such exercise of the considerable public market power is commonly perceived as a form of regulation, it is not regulation in the technical sense, inasmuch as it does not involve coercion. Pharmacies have the option of participating or not participating in the Medicaid drug programs and dispensing or not dispensing prescriptions according to the Medicaid price schedule and consistent with other program conditions. As such, the Medicaid drug programs are not formally different from the nongovernmental third-party plans and depends upon the same normal market forces that the United Federation of Teachers in New York City used in negotiating lower prices for its members. ("Use of Consumer Leverage to Reduce Prescription Costs...," American Druggist, November, 1976, p. 17.)

and generic price differentials do not simply reflect underlying differences in the costs of production.

3.2.1 Pricing Strategy

Drug manufacturers can naturally be expected to change their marketing and pricing strategies in response to the MAC provision. One possible form of pricing response is the following:

MAC reimbursement of multisource drugs will lead to greater price competition in multisource markets and result in lower average prices (and therefore cost savings) for private as well as public patients.

Unfortunately, as noted above, there are no generally accepted models of oligopolist behavior. Nevertheless, it is reasonable to make the assumption that, ceteris paribus, a greater profit and greater market share are preferred to a lesser profit and lesser market share. Consider the expression below for the change in profit ($\Delta\pi_i$) due to the i th manufacturer's reducing its price (P_i) to the MAC price level (P_{MAC}):

$$\Delta\pi_i = [P_{MAC} \cdot (Q_{public}^i + Q_{private}^i)] - [P_i \cdot Q_{private}^i] - [VC \cdot Q_{public}^i]$$

The manufacturer gains no substantial advantage by reducing its price to a level above the MAC reimbursement limit. However, at the MAC level, P_{MAC} , the manufacturer would have some portion, call it Q_{public}^i , of the public market share. We assume, for the sake of convenience, that private sector demand is highly inelastic with respect to price and remains unchanged at $Q_{private}^i$. The expression thus gives the change in revenue due to the price reduction less the cost of expanded output, where VC is the variable cost per unit. This expression must be greater than zero for a manufacturer to make the price reduction. This implies that the following holds:

$$(P_{MAC} - VC) \cdot Q_{public}^i > (P_i - P_{MAC}) \cdot Q_{private}^i$$

That is, the net revenue from the public market must exceed the revenue lost due from the public market must exceed the revenue lost in the private market. This suggests several additional hypotheses:

The likelihood that a manufacturer will reduce its price to the MAC level varies inversely with the magnitude of the price differential itself. In other words, prices are less likely to be reduced for the highest-price brand name products.

The likelihood that a manufacturer will reduce its price to the MAC level varies directly with the expected ratio of government to private market share. That is, ceteris paribus, a manufacturer having a smaller share of the private market is more likely to reduce its price.

Of course, it would be difficult to disentangle the effects of MAC from the effects of other recent developments that also tend to promote price competition in generic markets, including the passage of substitution laws in many states and the general trend toward more aggressive price advertising by pharmacies. All of these could serve to increase the price elasticity of demand in the private market. In addition, the exogenous increase in size of the generic market due to patent expiration and entry of brand name manufacturers into the generic market, have led to increased supplier competition.

Price effects are not necessarily limited to the multisource market. In particular, a well-known principle of optimal pricing in oligopolistic markets--markets in which the quantity demanded is not completely elastic with respect to price--holds that a larger share of fixed cost should be allocated to products having more inelastic demand.¹ That is, the optimal "mark up" is higher for those products for which the quantity demanded falls off less rapidly with increasing price. The substantial research and development costs in the pharmaceutical industry are financed in this fashion and account for a large portion of the differential between

¹See Armistead M. Lee, pp. 133-38 for a non-technical explanation.

brand name and generic prices (see Schankerman). MAC reimbursement can be viewed as increasing the elasticity of demand for multisource drugs relative to single-source entities. Thus, optimal pricing policy implies a relatively greater allocation of research and development costs to single-source drugs, and therefore that:

MAC reimbursement of multisource drugs will lead to absolute price increases for single-source products.

To the extent that a reduction in the "profit margin" on multisource drugs is offset by increases in the "profit margin" on single-source drugs, the estimated savings in reimbursement cost will overstate the "true" social benefit.² That is, to the extent that the industry can shift its earnings loss back to the consumer, both public and private, the cost-savings objective of the MAC program is partly undermined.

A related hypothesis has been suggested and briefly investigated by Dickens and Hogan (1977). In particular, the demand for multisource drugs could be said to be more elastic after implementation of the MAC program than before. Thus, the initial announcement of the MAC program meant that the demand for multisource drugs in the future would become relatively more elastic than was the demand at that time. Optimal pricing would therefore imply a relatively greater allocation of accumulated research and

¹This assumes that the brand name drug manufacturers have some degree of unexercised market power, that they are not "profit maximizers" but rather "profit satisficers." This reasoning also suggests that prices may be increased on the brand name multisource drugs still sold to private patients. If so, the effect is asymmetrical. As hypothesized above, there is an incentive for generic manufacturers to lower prices, and the incentive is larger the closer the manufacturer's price is to the MAC price. However, this analysis suggests that, if the price is not lowered to the MAC level and a manufacturer has lost sales as a consequence, there is then an incentive to raise the price of the MAC product.

²We define "profit margin" or net earnings to include accounting profit plus the R&D expenditure level, excluding market research.

development costs to the interval of time between announcement of the program and its implementation. Thus, it might be hypothesized that:

Announcement of the MAC program caused anticipatory increases in the price of drugs.

However, it is doubtful that this hypothesis can be meaningfully tested, because the effect of MAC's announcement was confounded with the effect of lifting Economic Stabilization Program (ESP) price controls. Dickens and Hogan found no evidence for the hypothesis, and it is probably not worth pursuing further.

3.2.2 Marketing Strategy

The impact of the MAC provision on advertising or promotional expenditures depends entirely upon the relative credibility of the manufacturers and the federal government. We hypothesize that:

Manufacturers will initially increase promotional expenditures for MAC products in order to persuade physicians to indicate "brand necessary."

If this short-run strategy is not successful, we may expect that:

In the longer run, manufacturers will spend less money in promoting MAC products, especially among physicians that tend to serve Medicaid patients.

Finally, in order to maintain higher mark-ups on single-source products, as hypothesized above, or to expand the relative size of the single-source market, it seems likely that:

Manufacturers will increase promotional expenditures for single-source products, especially those that are close substitutes for MAC products.

This also suggests the corollary hypothesis that, ceteris paribus, the relative market share of single-source products will increase.

3.2.3

R&D Strategy

Consider now the likely impact of generic substitution on industry research and development activity. It is first necessary to distinguish two types of R&D activity, "new" product innovation and "old" product modification. The first of these is more "basic" and is directed toward the discovery and development of a substantially different product, especially one for which there is not already a close therapeutic substitute. The latter kind of research is oriented toward modifying an existing product in order to gain minor improvements in efficacy or reductions in side effects that can be touted in promotion, but also to compound chemically distinct entities that can be patented as substitutes, either for a competitor's single-source product or for a no longer profitable multisource product (e.g., substituting Darvon-N for Darvon).¹ The economic literature (e.g., Commanor) suggests that such activity tends to be less valuable to society at large than it is for the firm itself and therefore that expenditures for such purposes are excessive. The MAC reimbursement program lowers the profit margin on multisource drugs and thereby increases the incentive to modify those multisource products in such a way as to develop substitutes that can be patented and marketed without being subject to MAC price limitations.² It is therefore predicted that:

MAC reimbursement of multisource drugs will lead to an increase in research and development expenditure for "old" product modification.

¹ While major new products are sometimes found in the process of old product modification, we assume that the research and development process is not altogether serendipitous and that the two R&D objectives can be usefully differentiated.

² Of course, if the government were to set MACs for a broader therapeutic class, encompassing all entities that are close therapeutic substitutes, this incentive would be removed.

It is not possible to test this hypothesis in the near term, inasmuch as we are unlikely to obtain current information on the industry's allocation of R&D funds. However, the hypothesis could be tested indirectly in the longer run by monitoring the pattern of new drug applications, to ascertain whether or not there has been an increase in the relative number of multisource drug substitutes being introduced.

Consider also the impact of MAC on the R&D investment in "new product development," the type for which there is a greater presumption of social worth. The government grants exclusive patent rights for a period of 17 years on all technical innovations, including drugs, to enable the innovator to recoup the costs of research and development. During this interval of patent protection, a drug manufacturer sets the price in excess of "marginal cost" in order to obtain a return on its R&D investment and is legally protected from direct competition, although indirect competition in the form of close therapeutic substitutes is uncontrolled. However, because of "brand recognition" and "habit persistence" factors, brand name products usually continue earning an excess return after expiration of patent and entry of direct generic competition. Thus, the MAC reimbursement policy can be seen as a decision by the government to discontinue paying a return on R&D investment after patent expiration.¹ This implies an unambiguous reduction in the profitability of R&D investment for new drug development. However, the effect may or may not be a "large" one.

Assume that, prior to MAC, a new product would earn a fixed amount per year in excess of production and promotion costs for each of the first

¹There are some exceptions. MAC reimbursement limits are being set for those patent-protected drugs available, due to licensing, from more than one source. This creates a significant incentive to discontinue licensing.

ten years on the market, and that it would earn half that amount per year for a second ten years, and nothing thereafter. It may still continue to be marketed after 20 years, but prices would have been driven down to the cost level.¹ Assume that the effective patent life is really 13 years, and therefore that the product is off patent for the last seven years of its 20-year commercial life. MAC reimbursement implies that no "excess profit" (or return on R&D) would be earned from government-reimbursed patients during the seven-year period when the product is off patent. If government prescriptions account for 25 percent of the retail pharmacy market and proceeds are discounted to the future at 8 percent per year, the present value of the earnings stream is reduced by only 2.9 percent. The reduction would be 4.9 percent if the earnings stream were not halved during the second ten years.²

Considering the substantial risk involved in "new product" research and development, and possibly much greater discounting than assumed above, it might seem that MAC would not have a major effect on the economic incentives to invest.³ On the other hand, the pharmaceutical industry has historically financed R&D from current earnings, and as a practical matter, may have limited incentive to seek external funding for that purpose. For one thing, the stockholders' risk is substantially increased if money is borrowed for such purposes. For another, an increase in stockholder investment would be

¹For the sake of convenience, this hypothetical examples assumes zero profits. Many older products clearly contribute positive profits to drug companies.

²As already noted, a portion of this reduction in earnings potential may be made up by an increase in price while still under patent.

³Of course, if the average commercial life is shorter than the effective patent period, there would be almost no effect on investment incentives whatsoever.

financed from after-tax dollars, whereas R&D is now financed from before-tax dollars--i.e., research and development becomes about twice as expensive from an investment perspective. Taking the above example, the average reduction in current earnings might be 6 percent--or 12 percent if the return were constant over the 20-year interval. Furthermore, if the industry were to maintain former "profit" levels, and we assume that profit accounts for about one-half of net earnings, the residual left for R&D would be reduced by twice as much--12 percent and 24 percent, respectively.

We have merely sought to illustrate several conceptual possibilities. Unfortunately, the empirical literature is not very helpful in discriminating the factors that influence industry R&D investment, except in the very long run. In any event, we hypothesize that:

MAC reimbursement policy will lead to a reduction in R&D expenditure for new drug development.

Unless the effect is a "large" one, it is doubtful that this hypothesis can be tested directly. First, assuming that is can be done at all, we are not likely to have information sufficient to distinguish between R&D expenditures for new product development and those for old product modification. Secondly, and more importantly, we probably could not discriminate a "small" MAC effect because of the many exogenous "shocks" affecting R&D incentives in recent times, including the 1962 FDA drug amendments, an alleged temporary depletion of R&D possibilities, and a large increase in federal R&D drug expenditure. The last of these bid up the industry salary scale. Even if an unambiguous negative effect of MAC on industry R&D were found, we would not know how to value that effect; in order to do so, one must have some sense of what the optimal R&D level is. One cannot merely assume that the patent law, having remained unchanged for so long, furnishes an appropriate incentive for R&D in every industry or even on the average. The incentive may be too much

in some industries and too little in others. It is important to reach some consensus as to what is the situation in the pharmaceutical industry.

3.3 Hypotheses Concerning the Impact on the Retail Pharmacy

The operational definition of "widely and consistently available" is an important intervening variable affecting evaluation of the MAC program. Although MAC products may be widely and consistently available from "any formulator or labeler" as required by law, they may or may not be available in all or most participating pharmacies, depending upon whether or not total demand for generic products justifies the expense of stocking them, and also depending upon whether or not a pharmacist accepts FDA assurances of bioequivalence and manufacturing quality control. We suggest the following hypotheses:

Pharmacy inventory costs may be increased if MAC products were not formerly stocked by most pharmacies.

Participating pharmacies may not stock all the MAC products (i.e., some products may not in fact be widely available at MAC price levels).

Pharmacists may informally require "brand necessary" certification for MAC products that are not stocked.

Pharmacists may dispense higher-priced brand name products for MAC products that are not stocked.

The rate of pharmacy participation in the Medicaid program may be reduced if MAC products are not widely available.

As a corollary, we also have that:

The societal cost savings is reduced for MAC products that are not widely available.

Because of wide variability in market prices for the same manufacturer's product and a presumed lack of competition, especially in the absence of widespread price advertising, state Medicaid programs have

traditionally sought to reimburse prescriptions at cost. They have taken a "value-added" approach in doing so, setting reimbursement equal to the ingredient cost plus the estimated cost of actually dispensing the product, the dispensing fee. In many states the ingredient cost has been taken as the Average Wholesale Price (AWP) listed in either the Red or Blue Book. However, because of various kinds of purchasing discounts, the actual prices paid by pharmacies were estimated to be 15 to 18 percent lower than such wholesale prices.¹ The EAC component of the MAC-EAC program requires that all states use actual price data in setting ingredient cost reimbursement levels. Thus, it is hypothesized that:

Reimbursement of ingredient costs will be decreased due to EAC.

However, the pharmacy organizations maintain that reimbursement of ingredient cost was necessarily excessive in order to compensate for dispensing fee levels that were too low. In response to this concern, the MAC-EAC regulations also required the states to conduct cost studies and establish reasonable cost-related fees. Thus, it can be hypothesized that:

The savings in reimbursement of ingredient cost will be partly offset by an increase in reimbursement of dispensing fees.

Nevertheless, the underlying assumption of the EAC reimbursement initiative was that:

Total drug reimbursement--ingredient cost and dispensing fee combined--will be decreased due to EAC, and the reimbursement savings will exceed the additional administrative and other program costs.

While regulations encourage states to set variable dispensing fee levels that take account of relevant pharmacy-related cost differences (e.g.,

¹ Norwood, Lipson, and Freeman found in a recent study of Iowa pharmacies that the mean differential between average wholesale price and actual acquisition cost was \$0.56 per prescription, equal to 17.5 percent of the actual acquisition cost.

chain vs. independent, urban vs. rural), almost all states set a single, fixed dispensing fee that applies to all pharmacies. Even if this fee fairly reflects average dispensing costs, it will be too high for some pharmacies and too low for others. Thus, any reduction in aggregate reimbursement levels, such as that implied by EAC, results in a greater number of pharmacies' having average costs in excess of the reimbursement levels. Consider the following expression for pharmacy profit (π) in discussing the implications:

$$\pi = P_G \cdot X_G + P_P \cdot X_P - VC(X_G + X_P) - FC,$$

where X_G is the number of government-reimbursed prescriptions,

X_P is the number of non-public (or private) prescriptions,

P_G is the average reimbursement level for government prescriptions,

P_P is the average prescription price paid by private patients,

VC is the variable cost per prescription (e.g., labor plus plus ingredient cost), and

FC is the fixed cost per prescription (e.g., overhead).

A pharmacy will accept government reimbursement (P_G) as long as it exceeds the variable cost (VC). However, this implies that the price charged to private patients (P_P) exceeds the average cost (AC), as shown below:

$$P_P \geq AC + X_G/(X_G + X_P) \cdot (P_P - P_G)$$

That is, some portion of the costs justifiably allocable to public-paid prescriptions may in fact be shifted to private consumers. Since private demand may be thought to be more price inelastic than the public sector's demand, optimal pricing implies such a greater allocation of fixed costs to private patients. Thus, we hypothesize that:

EAC reimbursement may lead to an increase in prescription prices for private patients.

The presumption seems to have been that any EAC cost savings would come out of pharmacy profit. If it does not, it is not a "true" social benefit, and from a social perspective the cost savings attributed to the program must be reduced accordingly.

If public reimbursement falls below the variable cost level, a pharmacy will discontinue participation in the Medicaid program. Thus, it may be hypothesized that:

EAC reimbursement will lead to a reduction in pharmacy participation.

Pharmacies might also respond to reduced reimbursement levels by eliminating free services such as delivery, patient monitoring, and consultation. While this reduces operating costs, it also reduces the social benefits.

If the financial viability of some pharmacies is threatened or the lower reimbursement levels are perceived to be inequitable, EAC reimbursement may also be a stimulus to fraudulent practices such as overbilling and prescription splitting. Of course, it would be difficult to monitor such outcomes directly, but an increase in the incidence of prescription splitting might perhaps be inferred if it were found that EAC caused an increase in the number of prescriptions per Medicaid enrollee.

3.4 Hypotheses Concerning the Impact on Physicians

Except in the comparatively few states that still have anti-substitution legislation, it was not apparent that the MAC reimbursement provision program would have a direct effect on physician prescribing behavior. In states permitting substitution the program can operate without the explicit cooperation of physicians. The physicians may still prescribe brand name products for Medicaid patients, but the pharmacist would substitute a lower-priced generic product unless the physician has specified "brand

necessary" on the prescription. Of course, in states with anti-substitution laws, a pharmacist must in principle call the physician for approval of the substitution. Such "call backs", if they occur, could be an annoyance to the physicians and might encourage generic prescribing for public patients--and possibly also for private patients.¹ Thus, it is hypothesized that:

MAC reimbursement policies lead to greater generic prescribing in states with anti-substitution legislation.

The MAC program also assumes that physicians generally will not exercise the "override" option.

3.5 Hypotheses Concerning the Impact on Consumers

If one assumes that MAC reimbursement policies lead to increased availability (i.e., stocking) of the lower-price generic equivalents, this may imply a significant spillover or "external" benefit to non-public consumers. Whereas a pharmacist has formerly been dispensing a higher-price brand name product on generic prescription, he might now dispense the lower-price generic product instead. Moreover, the possibility of generic substitution on brand name prescriptions could be indicated. It is therefore hypothesized that:

MAC reimbursement policies also lead to prescription cost savings for private patients.

Unfortunately, this important hypothesis could not be tested from the data collected in this study.

¹ Related to the MAC-EAC program, HCFA will soon distribute information on actual drug prices to physicians and pharmacists. This is being done on the assumption that pharmacists, and especially physicians, are not sufficiently aware of the substantial differences in price for generically equivalent products and that, once alerted to them, they will be more cost-conscious in their prescribing and dispensing. However, the dissemination of such information implies no change in pecuniary incentive to anyone; its presumed beneficial effect depends entirely upon a public-spirited concern for containing the cost of health care.

In order to conduct the econometric study reported in Section 6.0, it was necessary to survey the states and prepare a profile of state Medicaid drug program characteristics, 1974-1978. Some of the survey findings are reported herein, along with a descriptive analysis of general patterns and trends in the data.¹ While some of the survey information could be obtained from federal and private sources, most of it had to be gathered from the state Medicaid drug programs themselves. The managers of the state drug programs, generally referred to as pharmacist consultants, were the primary sources of information.

4.1

Administration of the Survey

The kinds of information sought as part of the Survey can be grouped into six broad categories:²

- Reimbursement Methods
- Program Restrictions
- Program Administration
- Pharmacy Participation
- Substitution
- Data Availability³

All data were to be obtained for a five-year time interval, 1974-1978. Prior to receiving OMB clearance, the survey instrument was pilot-tested in five states--Arkansas, California, Massachusetts, Tennessee, and Texas. Upon receipt of OMB clearance, a letter was sent to each state's pharmacist

¹Additional findings are reported in Appendix C.

²The actual survey instrument is shown in Appendix B.

³These results are not reported here.

consultant requesting cooperation and briefly describing the contents of the survey, the time required to complete the survey, the overall objectives of the project and stressing that the survey was voluntary. The pharmacist consultants were given the option of either performing the interview over the telephone or having the instrument mailed to them. Seven states chose the latter option--Kentucky, Louisiana, Missouri, New Jersey, Ohio, Oklahoma, and Hawaii. The remaining states were surveyed by telephone in May 1979.

A total of 46 states plus the District of Columbia completed the survey. No survey was not attempted in Arizona and Wyoming; Arizona does not have a Medicaid program, and Wyoming does not offer a drug benefit under Medicaid. Ohio and Hawaii declined to complete the survey. Furthermore, most of the questions proved inapplicable to Alaska, and that state is also not covered in this report.

Completed telephone surveys were returned to the pharmacist consultants for verification. Of the 40 states, including the District of Columbia, interviewed by telephone, 24 (or 60 percent) returned the completed survey with the corrections and additions as necessary.

4.2 Survey Findings

The general pattern of results from the state survey are reported below. Complete state-by-state information may be found in Appendix C.

4.2.1 Reimbursement Methods - Ingredient Costs

Medicaid drug reimbursement is determined in either of two fundamental ways: (1) the program pays the pharmacy an amount in reimbursement of reasonable ingredient costs plus a fee for dispensing the prescription, or (2) it pays the pharmacy's "usual and customary" charge to the general public. Medicaid programs generally pay the lower of these two amounts.

Table 4-1 indicates the different approaches used by each state to set ingredient cost reimbursement levels in 1978.¹ Most states used a combination of criteria--e.g., AWP less discount for some products, direct prices for others, plus a state MAC program for selected multisource products. The general categories are as follows:

- AWP - Average Wholesale Price, listed wholesale prices as published in either the Red Book or the Blue Book.
- AWP Less Discount - The Average Wholesale Price less a fixed percentage discount.
- Local Wholesale Prices - Lists of drug prices obtained from wholesalers doing business in the state.
- Direct Prices - The price charged by the manufacturer for direct pharmacy purchase.
- Quantity Prices - Drug products can be purchased by pharmacies in a variety of package sizes--e.g., bottles of 100, 500 or 1000 tablets. The price per unit generally declines as the package size increases. Medicaid programs usually calculate ingredient cost on the basis of the 100s price; however, the state may determine reimbursable cost on the basis of larger quantities, if it believes that pharmacies usually purchase the product in a larger package. Such "quantity" prices may relate either to AWP, local or manufacturer direct prices.
- Federal Decile - Prices based on information compiled for the federal government from a survey of actual invoice prices. The information is presented in decile format--for example, at a specified price, 70 percent of the invoice prices were less than or equal to that amount.
- AAC - Actual Acquisition Cost is the provider's actual invoice cost for the drug product, subject to audit verification.
- Mini-MAC - Some states also have their own MAC reimbursement limits, limits either on drugs not covered by the federal MAC program or lower limits on products included in the federal program.

Table 4-2 indicates the numbers of surveyed state programs using each method for determining ingredient cost reimbursement, 1974-1978. Inasmuch as most states used a combination of approaches, the number of

¹Similar tables for 1974, 1975 and 1976 are found in Appendix C.

Table 4-1
Reimbursement Methods - 1976

	AWP	AWP LESS DISCOUNT	LOCAL WHOLESALE	SELECTED PRODUCTS		FEDERAL DECILE			AAC	USUAL AND CUSTOMARY	OTHER
				DIRECT	QUANTITY	YES	NO	PERCENT			
Alabama			X	X			X			X	
Alaska	Only State-funded drug program										
Arizona	No Medicaid Program										
Arkansas	X						X			X	
California	X			X	X		X			X	State MAC
Colorado			X	X	X		X			X	State MAC
Connecticut	X			X			X			X	State MAC
Delaware							X		X	X	
D.C.			X	X	X		X			X	
Florida			X		X		X			X	State MAC
Georgia	X	X		X			X			X	
Hawaii											
Idaho	X		X				X			X	
Illinois			X		X	X		50%	X	X	State MAC
Indiana						X		70%	X	X	
Iowa			X	X	X		X			X	
Kansas	X		X	X	X		X			X	
Kentucky	X		X	X	X		X			X	State MAC
Louisiana			X		X		X			X	
Maine	X		X				X			X	
Maryland	X			X	X	X		70%		X	Lower EAC
Massachusetts		X	X	X	X		X			X	
Michigan	X	X	X				X			X	State MAC
Minnesota			X				X			X	
Mississippi						X		70%		X	State MAC
Missouri	X		X	X	X	X		< 70%		X	State MAC
Montana	X		X	X			X			X	
Nebraska			X		X		X			X	
Nevada	X				X		X			X	
New Hampshire			X				X			X	
New Jersey	X	X	X				X			X	
New Mexico				X	X		X			X	
New York			X	X	X	X		70%		X	
North Carolina	X				X	X		75%		X	
North Dakota	X		X				X			X	
Ohio	X						X			X	
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X	X		70%		X	State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	State MAC
South Carolina	X	X	X			X		70%		X	State MAC
South Dakota	X		X				X			X	State MAC
Tennessee							X			X	State MAC
Texas	X			X			X			X	X
Utah			X	X	X		X			X	State MAC
Vermont	X			X			X			X	
Virginia			X	X	X		X			X	
Washington			X				X			X	State MAC
West Virginia	X						X			X	
Wisconsin	X		X	X	X		X			X	State MAC
Wyoming	No Medicaid Drug Program										

alternatives indicated in a given year is much greater than the number of states surveyed.

Table 4-2

NUMBER OF STATES USING VARIOUS METHODS OF DETERMINING
INGREDIENT COST, 1974-1978

<u>Costing Method</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
AWP	28	32	32	28	26
AWP Less Discount	3	4	5	5	6
Local Wholesaler Prices	26	28	28	29	30
Direct Prices	10	10	15	19	22
Quantity Prices	12	13	17	20	22
Federal Decile	--	--	8	9	9
Actual Acquisition Cost	8	8	8	6	6
Usual and Customary Charge	31	33	40	45	46
State MAC	11	12	15	15	17

In 1978, 26 states used AWP for reimbursement, while six other states used AWP less discount--including four states that used a combination of the two approaches. A total of 30 states used local wholesaler-supplied prices for at least some products, and 22 states used manufacturer's direct prices and 22 states used prices based on larger package sizes. Nine states said that they used the federal decile levels in conjunction with other price indices to establish reimbursement limits. All states except one (South Carolina) also reported employing "usual and customary charge" restrictions. Several states used "actual acquisition cost," paying the lesser of actual acquisition cost and usual and customary.

The reimbursement situation in 1978 is considerably changed from that in 1974. In the years before the MAC/EAC regulations were promulgated, most states relied on either of two sources for setting reimbursement levels--AWP and local wholesaler-supplied prices. However, under the MAC/EAC regulations, the states must take greater account the actual prices applicable to drug products. The numbers of states using both direct and quantity prices doubled between 1974 and 1978, and these two approaches are now the most prevalent ones. Nonetheless, many states still rely on the average wholesale price (AWP) and local wholesale prices, for at least some products. The number of states also having their own MAC programs increased from 11 to 17 over the 1974-1978 interval. States having such programs in 1978 are indicated on Exhibit 4-1.

4.2.2 Reimbursement Methods - Professional Fees

The other component of prescription reimbursement is the professional fee. Medicaid programs may either pay a fixed dispensing fee per prescription or use more complex schemes--e.g., paying different fees for different products or having the amount of the fee depend upon the price of the prescription. The average professional fees for fixed fee states, 1974 through 1978 are presented in Table 4-3.¹ This table also indicates the average annual percentage increase in dispensing fees over the 1974-1978 interval. In the two years prior to EAC, the average dispensing fee increased at the rate of 3.76 percent per year. However, in the two years subsequent to EAC, the average fee has increased at the rate of 7.76 percent per year. The greater post-EAC rate of fee increase, due no doubt to the

¹Fee information for individual states is presented in Appendix C.

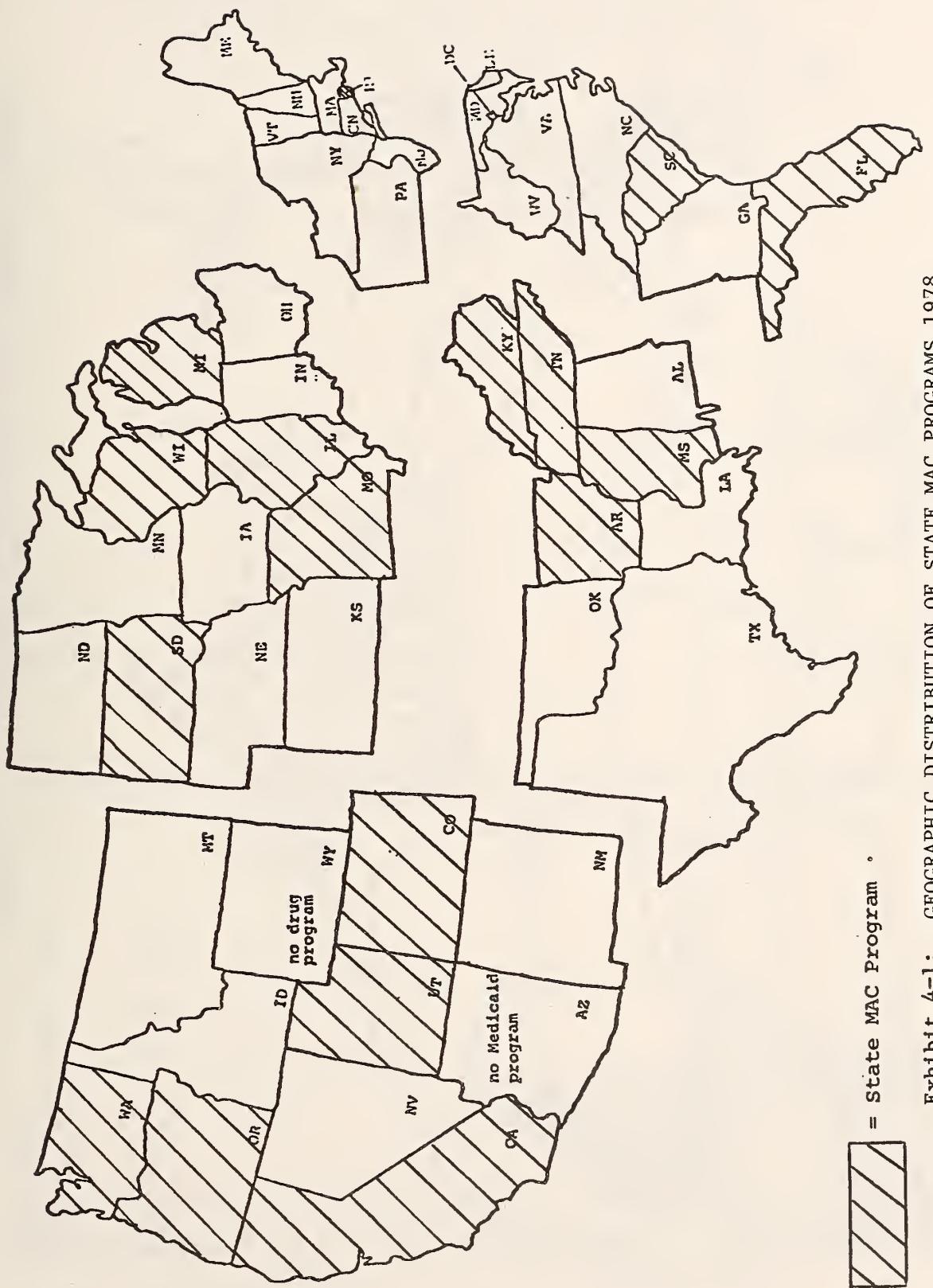


Exhibit 4-1: GEOGRAPHIC DISTRIBUTION OF STATE MAC PROGRAMS 1978

State MAC Program .

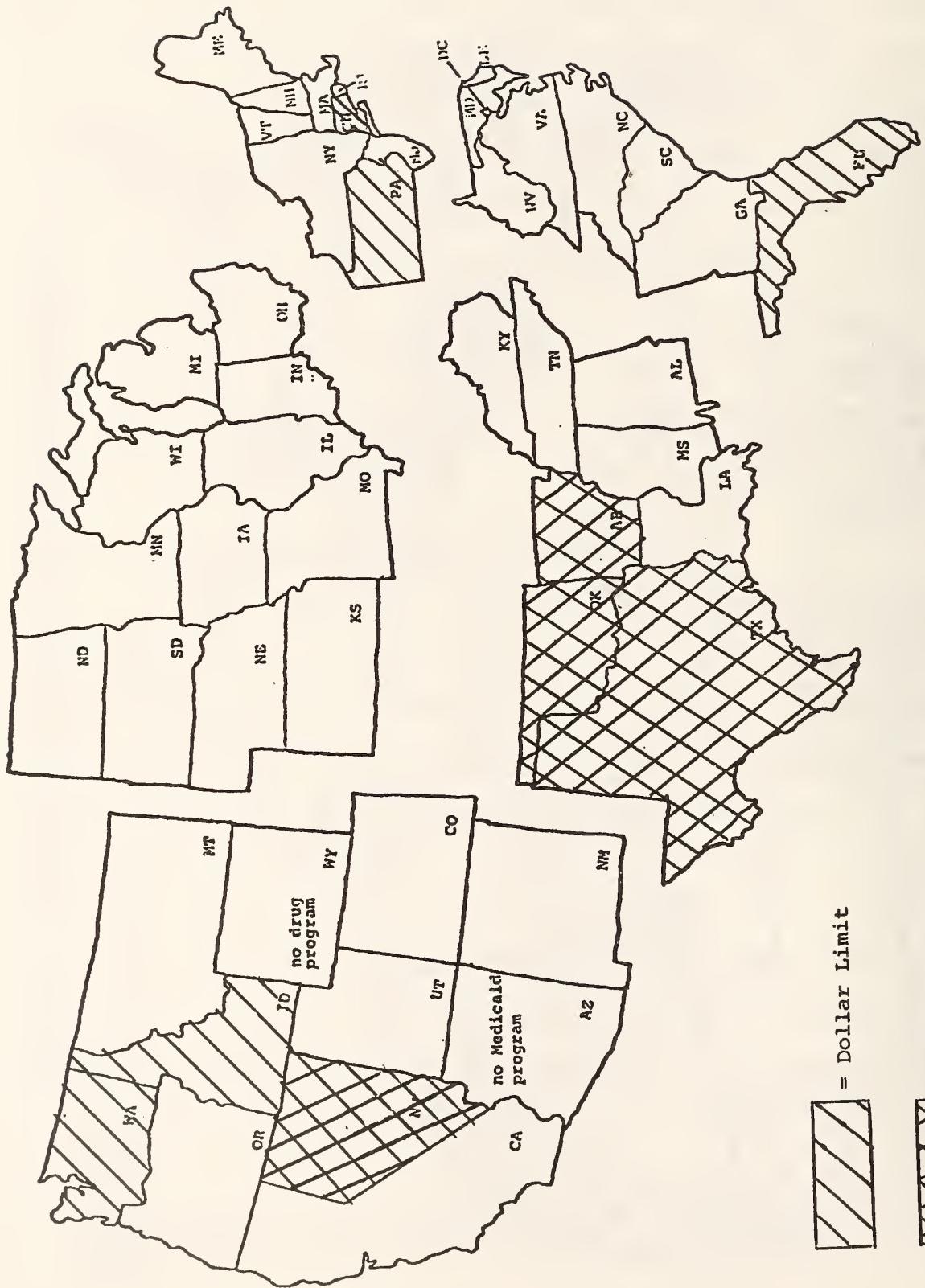


Exhibit 4-2: STATES WITH MONTHLY LIMITS ON THE NUMBER OR DOLLAR AMOUNT OF PRESCRIPTIONS IN 1978

= Dollar Limit

= Number Limit

mandate for reassessment of dispensing fees, implies that the average fee was 17.2¢ higher in 1978 than if the pre-EAC trend had continued.

Table 4-3

PROFESSIONAL FEE INFORMATION BY YEAR

<u>Year</u>	<u>Average Fee</u>	<u>% Change</u>
1974	\$1.96	—
1975	2.04	4.08%
1976	2.11	3.43%
1977	2.88	8.06%
1978	2.45	7.46%

Table 4-4 shows the distribution of states across fee level categories in 1976 and 1978. The table only reflects fixed fee states, of which there were two more in 1978 than in 1976.

Table 4-4

DISTRIBUTION OF FIXED FEE STATES ACROSS FEE LEVELS IN 1976 AND 1978

<u>Fee Range</u>	<u>Number of States</u>	
	<u>1976</u>	<u>1978</u>
0 - 1.99	8	0
2.00 - 2.24	20	5
2.25 - 2.49	3	14
2.50 and up	4	18
Total	35	37

As shown in Table 4-5, average fee levels are lower in the Northeast and higher in the West. Furthermore the pattern of regional differences is statistically significant.

Table 4-5

AVERAGE FEE BY REGION, 1976 AND 1978

Region	1976	1978
Northeast	\$2.03	\$2.19
North	2.06	2.49
South Atlantic	2.04	2.44
South Central	2.02	2.41
West	2.39	2.68
Average	\$2.11	\$2.45

4.2.3 Program Restrictions

Program restrictions are generally designed to control utilization, and thereby to control drug expenditures. In addition, they may be designed to ensure either the reasonableness of prescribing or the quality of the drugs prescribed. Restrictions can be grouped into three broad categories:

- Quantity limits--e.g., a maximum number of prescriptions that a patient may receive, a maximum drug expenditure or a maximum prescription size.
- Product restrictions--an open or closed formulary that proscribes the drugs reimbursable under the program.
- Co-payment--a requirement that the patient pay a small amount out-of-pocket for each prescription.

Prior authorization provisions permit override of such restrictions. Table 4-6 summarizes the kinds of restrictions found in each state during 1978.¹ Table 4-7 indicates the number of states with each type of restriction over the 1974-1978 interval.

¹Similar tables for 1974, 1975 and 1976 are available in Appendix C.

Table 4-6

Program Restrictions - 1978

QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			Mini-MAC
			Formulary	Prior Auth	Open	Closed				
Rxs	\$	Size					Yes	No	Amt	
Alabama	X				X		X		.50	
Alaska	Only State-Funded drug program									
Arizona	No Medicaid Program									
Arkansas	X ¹		X				X	X	.50	X
California		X		X	X			X		X
Colorado		X	X				X			X
Connecticut	X	X	X			X		X		
Delaware						X		X		
D. C.	X		X	X		X		X	.50	
Florida	X	X		X		X		X		X
Georgia			X	X			X	X	.50	
Hawaii										
Idaho		X	X	X			X		X	
Illinois	X		X	X		X		X		X
Indiana				X		X		X		
Iowa	X					X		X		
Kansas			X			X		X	.50	
Kentucky	X		X		X	X		X		X
Louisiana	X		X		X		X		X	
Maine	X		X			X			X	
Maryland	X		X		X	X		X	.50	
Massachusetts	X				X			X		
Michigan	X		X			X		X		X
Minnesota	X		X				X		X	
Mississippi	X		X		X		X		X	X
Missouri		X		X		X		X		X
Montana							X	X	.50 (over 2 refills)	
Nebraska			X			X		X		
Nevada	X ¹				X		X		.50	
New Hampshire	X				X			X		
New Jersey	X		X		X	X		X		
New Mexico	X			X		X		X	.25	
New York	X				X		X		X	
North Carolina							X	X	.50	
North Dakota	X			X			X		X	
Ohio	X		X		X	X		X		
Oklahoma	X ¹				X		X		X	
Oregon			X	X		X		X		X
Pennsylvania	X	X	X	X		X		X		
Rhode Island	X		X			X		X		X
South Carolina	X		X		X	X		X	.50	X
South Dakota			X				X	X	.50	X
Tennessee	X		X	X		X			X	X
Texas	X ¹		X				X		X..	
Utah				X		X		X		X
Vermont	X			X		X			X	
Virginia							X	X	.50	
Washington		X	X		X	X		X		X
West Virginia	X		X			X			X	
Wisconsin			X			X			X	X
Wyoming	No Medicaid Drug Program									

¹ Limit on number of prescriptions per month

Table 4-7

NUMBER OF STATES WITH CERTAIN PROGRAM RESTRICTIONS BY YEAR

<u>Restrictions</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Formulary					
Open	12	14	14	14	16
Closed	8	10	10	12	12
Limit on No. of Rxs	30	31	30	30	30
Dollar Limits	5	5	5	5	5
Size Limits	27	28	30	30	29
Prior Authorization	27	29	30	31	30
Co-payment	3	7	12	17	13

In 1978, 30 states had prescription limits of varying restrictiveness. The most common was a limit on the number of refills allowed, usually five refills over six months. A total of 29 states had prescription size limits in 1978. Such limits often depend upon the condition being treated; for example, a state may limit the antibiotic prescription size to a ten-day supply for acute conditions, but to a minimum 30-day supply for chronic conditions. Furthermore, some states limit the prescription size to a 30-day supply, since Medicaid eligibility is generally determined on a month-by-month basis. Four states in 1978 had limits on the number of prescriptions per month--Arkansas, (4 Rxs per month), Nevada (3), Oklahoma (3), and Texas (3). Five states had limits on the dollar amount that a recipient was allowed in drug reimbursement per month--Connecticut, Florida, Idaho, Pennsylvania, Rhode Island, and Washington. Florida's limit was \$22.00, Idaho's \$35.00, and Washington's \$25.00. Connecticut dropped its limit in mid-1978. Pennsylvania's limit applied to each prescription. In 1978, the program had to give prior approval for any prescription costing over \$15.00.

A formulary is a listing of drug products for which the Medicaid program reimburses. A "closed" formulary is a comprehensive listing of the drugs reimbursable by the program. The state will not pay for drugs not included in the formulary. An "open" formulary is a list of drugs that a program definitely covers but does not explicitly exclude any drugs or drug classes. This type of formulary is generally much less restrictive and practically all available drugs are reimbursable. A state may also have no formulary at all, in which case it pays for almost any drug billed to the program. Nonetheless, there may still be exceptions--e.g., stimulants, vitamins and narcotics. In 1978, 16 states had open formularies and 12 states had closed formularies. The use of formularies has grown somewhat over the five-year period. In 1974, 20 states had a formulary, and in 1978, there were 28 states with formularies. The number of states with closed formularies increased by four, as did the number of states with open formularies. Exhibit 4-3 shows the geographic distribution of these states. As can be seen, the South Central region of the country has the largest concentration of closed formularies.

Obviously, there are exceptions to program restrictions, and many states generally have prior authorization mechanisms for making such exceptions. For example, a state with a closed formulary might still have a mechanism for authorizing reimbursement of drugs not included on the formulary. Or, it might provide for recipients to exceed the dollar limit or the limit on the number of prescriptions. The number of state with prior authorization provisions of some kind increased from 27 in 1974 to 30 in 1978.

Another kind of program restriction is the requirement that recipients pay a small amount out-of-pocket for each prescription. Copayments were originally used in California in 1972-73. At that time, the

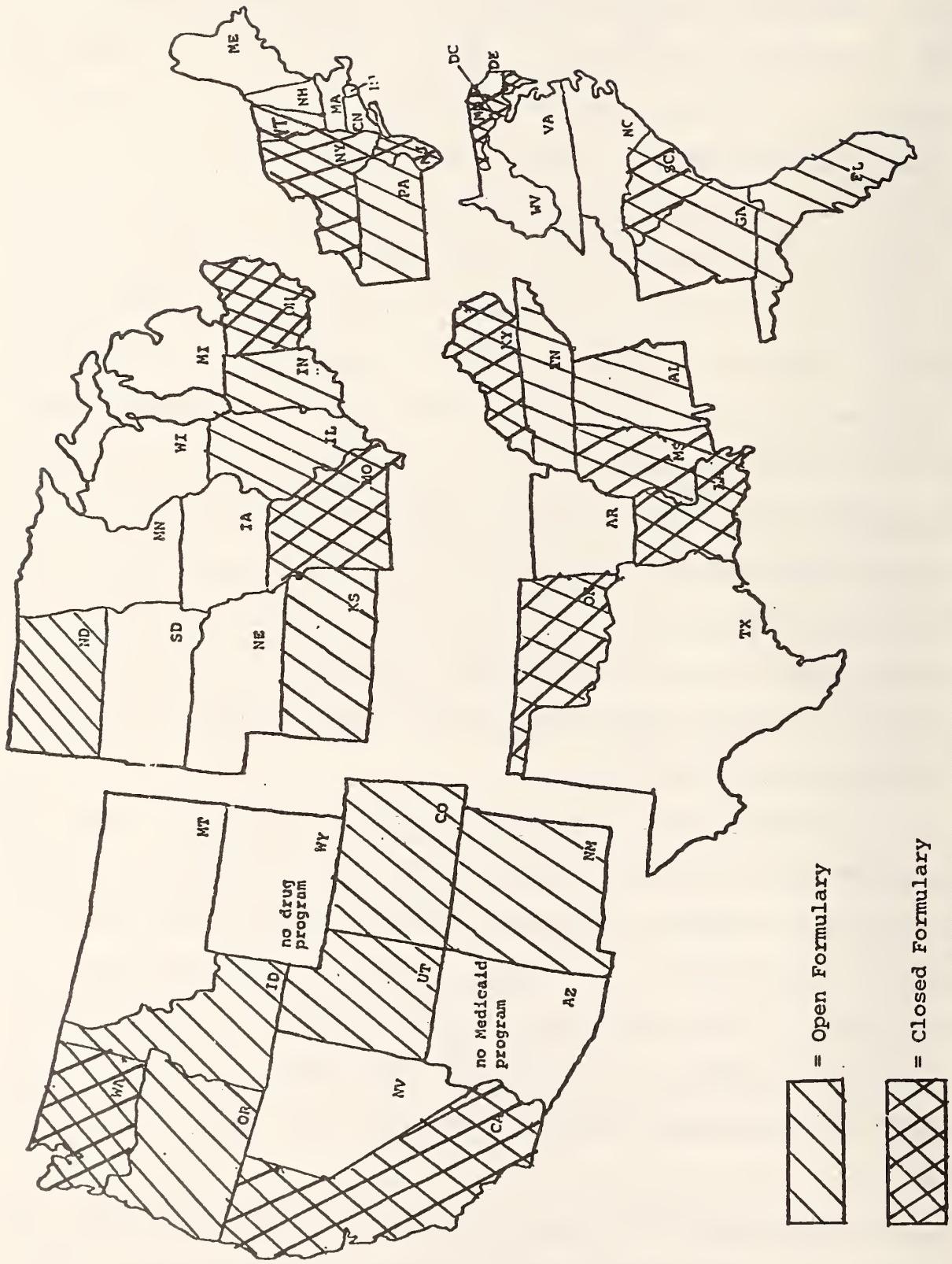


Exhibit 4-3: STATES WITH OPEN AND CLOSED FORMULARIES IN 1978

program was run under a waiver, as such charges were then prohibited by federal statute. The law was amended in 1974 to permit copayment. In 1974, three states added copayments, and by 1977 the number of states having copayment had grown to 17. However, the number of states requiring copayment dropped back to 13 in 1978 when New York, Florida, Mississippi, and Michigan eliminated the requirement. With two exceptions, New Mexico at \$.25, and Nevada with a variable amount, the copayment amount is \$.50 per prescription. Copayments tend to be used most often in the South Atlantic and South Central regions; eight of the 13 states with copayment in 1978 are located in these southern regions.

Generalizing about 47 discrete Medicaid programs and their restrictions is practically impossible. Nonetheless, we have classified state programs into four groups, according to the number of program restrictions in 1978--none or one restriction, two, three, and four or more restrictions--and compared each group of states with the average annual drug cost per recipient for that group. As seen in Table 4-8, the average annual drug cost decreases as the number of restrictions increases.

Table 4-8

AVERAGE DRUG COST PER RECIPIENT BY RESTRICTIVENESS OF STATE, 1978

	<u>Average Annual Drug Cost/Recipient</u>	<u>Number of States</u>
States with 0 - 1 restrictions	\$145.48	13
States with 2 restrictions	139.01	13
States with 3 restrictions	130.45	10
States with 4 restrictions	127.78	9
Average	\$136.73	45

We have also examined the relationship between Medicaid recipients as a percentage of the state's population and the number of restrictions in that state. We hypothesized that, the larger the percentage the greater is the burden on a state's resources, and therefore the greater will be the state's emphasis on utilization controls. This hypothesis is supported by the results in Table 4-9. States with more restrictions tend to have a higher percentage of Medicaid recipients in the general population.

Table 4-9

PERCENTAGE OF POPULATION ON MEDICAID BY RESTRICTIVENESS OF STATE, 1978

	<u>Medicaid Recipients as a Percentage of Total Population</u>	<u>Number of States</u>
States with 0 - 1 restrictions	3.0	14
States with 2 restrictions	3.3	13
States with 3 restrictions	4.3	11
States with 4 restrictions	4.0	9
Average	3.6	47

4.2.4 Other Areas Covered by the Survey

The survey also asked questions concerning the status of product substitution statutes in the state, the method and cost of administering the drug program, and the rate of pharmacy participation. The findings are summarized below:

- Substitution. The MAC program depends to some degree on the ability of the pharmacist to substitute a lower-cost drug in cases where the physician has written the prescription for a brand product that costs more than the MAC price. Many states have had statutes prohibiting substitution. However, over the last several years, most anti-substitution laws have been repealed. The status of the laws in each state as of December 1978 is indicated in Appendix C. There were 11 states that had not repealed substitution laws as of 1978. However, to date,

only four states still have anti-substitution laws according to the American Pharmaceutical Association. For states having anti-substitution laws in 1978, the survey inquired how the operation of the MAC program was affected. In all cases, program officials stated that the situation was handled informally and that pharmacists did make substitutions.

- Administration. The survey found that less than half of the states ran their own claims processing system. The majority contract for claims processing and payment. The survey was less successful in identifying the costs associated with drug programs. In some cases, pharmacist consultants indicated the amount of the contract with the fiscal agent or the cost per claim processed. Except for Texas and Maryland, the state administrative costs for the drug program were not known. The costs were merely subsumed in the overall Medicaid program budget.
- Pharmacy Participation. Pharmacist consultants were asked about the level of pharmacy participation during the period 1974 through 1978. The survey findings indicate that virtually no change in participation occurred during this interval, decreasing only slightly from 94.1% to 93.6%. However, one should view these statistics with caution. For the most part, the participation rates reported were merely the pharmacist consultants' "educated guesses".

5.0

MAC-EAC EFFECTS IN FIVE STATES

This section summarizes and integrates the results from analysis of MAC-EAC in five study states--Arkansas, Maine, Massachusetts, Minnesota, and Tennessee. More extensive reports were earlier prepared on MAC-EAC in four of the five study states, Arkansas being the exception. Although not specific to the study states, MAC-related effects on industry price levels are also examined in this section. Estimates of MAC-EAC administrative costs at the federal level are also developed, as well as administrative cost estimates for each of the five study states.

5.1

State Selection

To the extent possible, the five study states were selected on the basis of the following criteria:

- Demonstrated Record of Maintaining "Clean" Prescription Records. Availability of complete, accurate claims data was a necessary condition.
- Stable Administration of Program. It was desirable that the drug program administrator should be unchanged over the study period.
- Cooperation with Federal Studies. The state should have a record of cooperating with federal studies.
- General Representation of Program Sizes and Geographic Regions. The states should represent a good cross-section with respect to program size and geographic location.

Unfortunately, it can not be said that the latter requirement was met. Only one large state was included (Massachusetts) and no states were included from either the West or the Southeast.

Auxiliary criteria were also considered in selecting several of the states. In part, Massachusetts was selected as the first state to be studied because its proximity to Abt Associates was considered desirable for pilot

study purposes. Also, Tennessee had a long-standing state MAC program whereas Arkansas has a more recently adopted such a state MAC program.

5.2 MAC/EAC Implementation in the Five States

Each state used a somewhat different approach in implementing the MAC/EAC program. The federally mandated and actual MAC implementation dates in the five study states for the five initial MAC products are shown in Table 5-1. In general, the MAC limits were implemented on time. For Arkansas and Tennessee, the state MAC implementation dates for these products are also shown in Table 5-1. Distinctive features of MAC-EAC implementation in the five states are now discussed.

5.2.1 Massachusetts

The Massachusetts Medicaid Program began implementation of the MAC portion of the program in the summer of 1977, but there were several distinct stages of implementation. Initial implementation simply involved notifying participating pharmacies about the MAC program and imposing the MAC reimbursement limits on non-branded ampicillin and non-branded penicillin VK only. Reimbursement limits for leading brands of the MAC products were not reduced to the MAC level; pharmacists were expected to voluntarily switch to the non-branded products and were allowed to submit claims for higher-priced brands without accompanying verification of brand-necessary certification. Since this approach did not achieve the desired substitution of lower-priced brands, the state changed its approach and on June 15, 1978 imposed the MAC reimbursement limits on all brands of the MAC products.¹ An override

¹As will be seen, no reimbursement savings were achieved prior to this date.

Table 5-1
Federal and State MAC Implementation Dates in the Study States for the Five Initial MAC Products

Product	Federally Mandated Implementation Date	Arkansas		Actual Implementation Dates		Tennessee State	Federal ¹
		State	Federal	Maine	Massachusetts		
Ampicillin Caps	July 1, 1977	Jan. 1, 1976	July 1, 1977	June 27, 1977	Sept. 1, 1977	Dec. 1971	Not Applicable
Ampicillin Liquid	Oct. 25, 1977	Jan. 1, 1976	Oct. 25, 1977	Oct. 25, 1977	Dec. 1, 1977	Jan. 1972	Not Applicable
Chlordiazepoxide HC1	July 1, 1978	Not Applicable	July 1, 1978	Aug. 7, 1978	May 18, 1978	July 15, 1978	Oct. 1, 1978
Penicillin VK	October 25, 1977	Jan. 1, 1976	Oct. 25, 1977	Oct. 25, 1977	Dec. 1, 1977	July 1977	Not Applicable
Propoxyphene HC1	April 10, 1978	Jan. 1, 1976	Apr. 10, 1978	May 10, 1978	Apr. 24, 1978	Nov. 1975	Not Applicable
Tetracycline HC1	April 10, 1978	Jan. 1, 1976	Apr. 10, 1978	May 10, 1978	Apr. 10, 1978	Dec. 1971	Not Applicable

¹State MAC reimbursement levels in Tennessee were generally lower than those required by the federal program for the initial five MAC products. Therefore, new initiatives were generally not required to implement the federal MAC limits for these products.

mechanism for reimbursing "brand necessary" claims was instituted at the same time.

While the reimbursement limits for branded products were reduced to the MAC limits, the state continued to use the MAC limits as the only reimbursement limits for non-branded MAC products. In effect, the state has taken the MAC limits as also being the estimated acquisition costs limits for these products, even though former reimbursement limits were sometimes considerably lower. As will be seen, the practice has increased ingredient cost reimbursement for non-branded MAC products compared to what it otherwise would have been, and has limited the reimbursement cost savings achieved by the MAC program in Massachusetts.

The EAC program adopted by the Massachusetts Rate Setting Commission consists of three parts. Rather than using average wholesale price (AWP) for a standard package size--as was formerly done--drug products were assigned to one of three reimbursement categories:

- Direct Price - Products purchased from certain manufacturers are now reimbursed at the direct price; the state's initial list of direct price products included 42 non-MAC dosage forms.
- Volume Wholesale Price - Selected products are reimbursed at AWP for larger package sizes, less a five percent discount; the state's initial list of volume wholesale products included 20 non-MAC dosage forms and 6 MAC dosage forms.
- Average Wholesale Price and Wholesale Price - Other products are reimbursed at AWP less a five percent discount.

The EAC reimbursement limits were implemented on September 14, 1978.

5.2.2 Maine

The Maine Medicaid program began implementation of the MAC portion of the MAC/EAC regulations during the summer of 1977. The MAC limits were first handled in a manner similar to that used for new products. Unique product code numbers were assigned to each MAC dosage form, and pharmacies

were required to claim reimbursement using these codes, irrespective of brand actually dispensed. However, a substantial percentage of claims for some products (e.g., chlordiazepoxide and propoxyphene) continued to be submitted using brand name codes. It was assumed that "brand necessary" had been indicated by the prescribing physician. The use of a unique product code for each brand also raised the allowable reimbursement for some lower-price, non-branded products to the MAC level. On September 1, 1978, the state reinstated its former product codes and imposed MAC limits on each brand and dosage form of the MAC products. At the same time, a state MAC on chlordiazepoxide HCl tablets was adopted as a means of discouraging prescription shifts from chlordiazepoxide HCl capsules to the tablet form, which is not covered by the federal MAC.

An EAC program similar to the one implemented in Massachusetts was adopted in January 1979. Some 158 large-selling product dosage forms were assigned to one of two reimbursement cost categories:¹

- Direct Price. The state's initial list of direct price products included 48 tablet dosage forms and 13 liquid dosage forms. The most frequently dispensed package size for each of dosage form was identified, and the price of that package size used.
- Volume Wholesale Price. These products are reimbursed at the AWP for larger package sizes less a five percent discount. The state's initial list of volume wholesale price products included 75 tablet dosage forms and 21 liquid dosage forms.

In January 1979, the state began vigorous enforcement of the usual and customary charge as an upper reimbursement limit. Pharmacists are required to enter their "usual and customary charge to the general public" on every claim form. The program administrator performs periodic audits and

¹ Insulin designated a "usual and customary charge to the general public" product.

examination of posted prices to verify the accuracy of the prices indicated on submitted claims.

5.2.3 Minnesota

The Minnesota Medicaid program began implementation of the MAC portion of the MAC/EAC program during the fall of 1977. Since Minnesota uses the ten-digit NDC Code that identifies product, dosage, and package size, the task of identifying and changing the appropriate MAC codes was substantial. When a claim is received for a MAC product, the lower of either the MAC or the EAC reimbursement limit is applied, unless the physician has specified "dispense as written," in which case the EAC limit is used.

The state generally uses local wholesaler-supplied prices for reimbursement of non-MAC products. However, for some products, the state also compares local wholesale prices to the Federal decile prices and adopts lower reimbursement limits if the discrepancy is substantial.

5.2.4 Tennessee

Tennessee adopted a state Maximum Allowable Cost Program in January 1972. The state's MAC program covers many of the same products included in the federal program. To date, almost all MAC limits established by the state have been lower than the subsequent federal MAC limits. Thus, reimbursement limits have generally not been changed by the federal MAC program. Propoxyphene HCl Compound, one of the study products, is not included in the state's formulary and is not reimbursable.

The Tennessee program uses a "generic product file" based on the CHAMPUS (retired and civilian military health program) codes, and individual brands are not assigned separate codes. For example, all brands of 250 MG ampicillin capsules are listed under one code number, regardless of

manufacturer. Since 1972 the state has reimbursed non-MAC products on the basis of Actual Acquisition Cost. Pharmacies claim the actual price paid for the product and the state pays the amount claimed, subject to potential audit verification.

5.3.5 Arkansas

The Arkansas Medicaid program adopted a mini-MAC program on January 1, 1976, but most of the state MAC products are now covered by the federal MAC program. In general, the state MAC reimbursement limits were somewhat higher than the federal ones. The state continues to use AWP for reimbursement of non-MAC products.

5.3 Data and Data Preparation

The primary data used in this part of the study were drug claim statistics from each of the five study states. The numbers of prescriptions, numbers of units dispensed, and amounts paid were aggregated by product, dosage form, and manufacturer for the nine, ten, or eleven most recent six-month time intervals in each state.¹ The initial study design had called for the use of January-June and July-December as the six-month time periods. However, in the Massachusetts pilot study, the time intervals were changed to April-September and October-March in order to avoid biases introduced into that state's date-of-payment utilization statistics by payment lags at the end of the fiscal year. In order to maintain comparability, we then sought to employ the same time intervals in the four other study states. However, this could not be done in Arkansas; we were constrained

¹ Such information is reported in one of the standard MMIS reports, the Drug Usage Report or Drug Analysis Profile.

to use data that had already been aggregated into the originally planned January-June and July-December time periods.

In Massachusetts and Maine, the aggregated drug utilization and reimbursement data were prepared to study specifications by the fiscal intermediaries--Pilgrim Health Systems in Massachusetts and Health Systems Institute (HSI) in Maine. In Tennessee the requisite data were generated from research files maintained by Dr. Charles Federspiel and Mr. Wayne Ray at Vanderbilt University. The state of Minnesota supplied paid claims data--about six million claims since 1975--and the aggregation was done by Abt Associates. Finally, Arkansas furnished microfiche copies of pre-existing Drug Utilization Reports. The interval of time covered by the data and thereupon the number of six-month time periods available for each study are indicated below:

<u>State</u>	<u>Interval Covered</u>	<u>Number of Six-Month Time Periods</u>
Massachusetts	April 1974 - March 1979	10
Maine	April 1975 - Sept. 1979	9
Minnesota	April 1975 - Sept. 1979	9
Tennessee	April 1974 - Sept. 1979	11
Arkansas	January 1975 - June 1979	9

The beginning and ending dates for the interval covered, as well as the numbers of six-month time periods available, vary from state to state because of idiosyncratic problems with the earlier data in Maine, Minnesota and Arkansas. Also, the Massachusetts data had been obtained much earlier in the study. We originally sought to obtain data for at least ten six-month time periods in each state.

While the data indicate reimbursement by product and time period, the portion of this amount allowed for reimbursement of ingredient cost must

be estimated. Two alternative techniques for doing so were used. One approach, the dispensing fee approach, involves subtracting a dispensing fee allowance--e.g., the number of prescriptions times the dispensing fee--from the total reimbursement amount. The other approach involves multiplying the total number of units dispensed by the program's actual per-unit ingredient cost reimbursement limits, and is called the allowable ingredient cost approach. Of course, if all prescriptions were reimbursed on the basis of the allowable ingredient cost plus the dispensing fee, these two techniques would yield identical estimates. Different results are obtained to the extent that the "usual and customary" price--i.e., the price charged to non-Medicaid customers--is lower than the ingredient cost limit and the pharmacies actually claim the lower amount as reimbursement. The results would also be different to the extent that physicians specify "brand necessary" and override the MAC reimbursement limits. Although the results obtained were generally quite similar, we have used the average of the two estimates whenever possible. This could not be not done in two of the five states, Minnesota and Tennessee. In Minnesota the allowable ingredient cost reimbursement levels were not readily available, and in Tennessee the actual acquisition cost approach to ingredient cost reimbursement did not require the use of such data. Thus, in these two states ingredient cost reimbursements were estimated using the dispensing fee approach exclusively.¹

5.4 MAC-Related Savings

Using data from the five study states--Arkansas, Maine, Massachusetts, Minnesota and Tennessee--we have estimated the reimbursement

¹In addition, due to inconsistency in the reporting of units, only ingredient cost-based estimates could be developed for non-tablet dosage forms (e.g., liquids) in Massachusetts.

savings achieved on each of the five initial MAC products, including fifteen product-dosage forms:

- (1) Chlordiazepoxide HCl (Librium)
 - 5 MG CAPS
 - 10 MG CAPS
 - 15 MG CAPS
- (2) Propoxyphene HCl (Darvon)
 - 65 MG CAPS
 - 65 MG CMPD CAPS
- (3) Ampicillin
 - 250 MG CAPS
 - 500 MG CAPS
 - 125 MG LIQ
 - 250 MG LIQ
- (4) Penicillin VK
 - 250 MG TABS
 - 500 MG TABS
 - 125 MG LIQ
 - 250 MG LIQ
- (5) Tetracycline HCl
 - 250 MG CAPS
 - 500 MG CAPS

For each product-dosage form in each of the five study states, the utilization and ingredient cost reimbursement were estimated and reported by manufacturer and time period, as illustrated in Table 5-2 for propoxyphene HCl, 65 MG CAPS in Minnesota.¹ In particular, the table shows the time trend in per-unit and per-prescription ingredient cost reimbursement by manufacturer and again in the aggregate, as well as information on the percentage distribution of the market across manufacturers.²

¹All comparable tables generated in this study have been provided to HCFA.

²Recall that Tennessee uses a generic drug code that does not distinguish manufacturer. Thus, only aggregate information were available for that state.

Table 5-2

Cost Per Unit, Cost Per Prescription, and Percent Represented by
Brands of Propoxyphene HCl 65 Mg. Compound Capsules: Minnesota

Product/Manufacturer Time Period	Cost/ Unit	Cost/ Prescription	Percent of		
			Ingredient Cost	Units	Prescription
<u>Darvon/Lilly</u>					
Apr. '75 - Sept. '75	0.0668	3.1817	96.04	94.36	95.18
Oct. '75 - Mar. '76	0.0670	3.2110	96.52	94.92	95.15
Apr. '76 - Sept. '76	0.0682	3.2040	96.74	95.15	95.18
Oct. '76 - Mar. '77	0.0682	3.2504	96.91	95.20	95.26
Apr. '77 - Sept. '77	0.0692	3.2202	96.97	94.60	95.31
Oct. '77 - Mar. '78	0.0694	3.2650	96.38	93.65	94.03
Apr. '78 - Sept. '78	0.0533	2.4032	74.36	64.77	65.33
Oct. '78 - Mar. '79	0.0427	1.7978	48.80	40.63	43.45
Apr. '79 - Sept. '79	0.0477	2.0870	41.79	33.42	34.82
<u>Dolene/Lederle</u>					
Apr. '75 - Sept. '75	0.0405	1.9198	1.26	1.80	1.82
Oct. '75 - Mar. '76	0.0373	1.9237	1.27	1.97	1.84
Apr. '76 - Sept. '76	0.0408	1.6607	1.40	1.94	2.24
Oct. '76 - Mar. '77	0.0469	1.6077	1.06	1.26	1.75
Apr. '77 - Sept. '77	0.0432	1.9414	0.73	1.00	1.04
Oct. '77 - Mar. '78	0.0390	1.7210	0.84	1.23	1.32
Apr. '78 - Sept. '78	0.0369	1.7379	3.06	3.51	3.39
Oct. '78 - Mar. '79	0.0344	1.6220	8.71	8.73	8.31
Apr. '79 - Sept. '79	0.0352	1.6602	9.41	9.57	9.25
<u>SK-65 Cmpd. SKF</u>					
Apr. '75 - Sept. '75	0.0364	1.5755	1.14	1.70	1.89
Oct. '75 - Mar. '76	0.0357	1.4429	0.95	1.39	1.65
Apr. '76 - Sept. '76	0.0360	1.3973	0.78	1.14	1.38
Oct. '76 - Mar. '77	0.0357	1.7244	0.91	1.45	1.43
Apr. '77 - Sept. '77	0.0360	1.8214	1.22	1.97	1.83
Oct. '77 - Mar. '78	0.0323	1.7222	1.31	2.32	2.05
Apr. '78 - Sept. '78	0.0304	1.3635	6.26	7.93	8.05
Oct. '78 - Mar. '79	0.0300	1.4545	12.70	13.91	12.91
Apr. '79 - Sept. '79	0.0312	1.3852	14.04	14.96	15.38
<u>Misc.</u>					
Apr. '75 - Sept. '75	0.0495	4.5875	1.55	2.14	1.11
Oct. '75 - Mar. '76	0.0474	2.8943	1.26	1.72	1.35
Apr. '76 - Sept. '76	0.0398	2.7354	1.09	1.77	1.21
Oct. '76 - Mar. '77	0.0319	2.0451	1.12	2.09	1.55
Apr. '77 - Sept. '77	0.0247	1.5489	1.09	2.43	1.81
Oct. '77 - Mar. '78	0.0282	1.4337	1.48	2.79	2.59
Apr. '78 - Sept. '78	0.0250	1.1642	16.33	23.80	23.23
Oct. '78 - Mar. '79	0.0245	1.1438	29.80	36.73	35.32
Apr. '79 - Sept. '79	0.0265	1.2556	34.76	42.05	40.56
<u>Totals</u>					
Apr. '75 - Sept. '75	0.0655	3.1475	100.00	100.00	100.00
Oct. '75 - Mar. '76	0.0657	3.1567	100.00	100.00	100.00
Apr. '76 - Sept. '76	0.0669	3.1422	100.00	100.00	100.00
Oct. '76 - Mar. '77	0.0668	3.1843	100.00	100.00	100.00
Apr. '77 - Sept. '77	0.0673	3.1544	100.00	100.00	100.00
Oct. '77 - Mar. '78	0.0671	3.1703	100.00	100.00	100.00
Apr. '78 - Sept. '78	0.0439	1.9977	100.00	100.00	100.00
Oct. '78 - Mar. '79	0.0333	1.4964	100.00	100.00	100.00
Apr. '79 - Sept. '79	0.0353	1.6108	100.00	100.00	100.00

Examine now the aggregate or "TOTALS" data in Table 5-2. The reader will note the abrupt decline in ingredient cost reimbursement, both per unit and per prescription, that begins in the 4/79-9/78 period. It was during this period that the MAC reimbursement limit on propoxyphene became effective. The average ingredient cost reimbursement declined sharply from 6.5¢ per unit to 3.7¢ per unit over a 12-month interval. Furthermore, the average ingredient cost reimbursement per prescription fell from \$3.35 to \$1.85. However, it may not be quite appropriate to simply take such "price" reductions as measuring the MAC-related savings in ingredient cost reimbursement. Due to competition and other market factors, the prices of many generically available drugs are declining over time anyway. Furthermore, in some cases (e.g., tetracycline), market shares were already shifting toward the less expensive generic substitutes. We therefore sought to take account of any such exogenous price trends by fitting a linear relationship between the pre-MAC reimbursement levels and the number of the time period, and then using this relationship to project what the post-MAC reimbursement levels would otherwise have been.¹ Except for chlordiazepoxide, this could not be done in Arkansas. Reimbursement data were available for only two six-month time intervals prior to introduction of state MAC limits on the four other MAC products being studied. Thus, the pre-MAC reimbursement levels were also taken as the projected reimbursement levels for these products. Furthermore, Tennessee's state MAC limits on propoxyphene, ampicillin, and tetracycline were implemented prior to the beginning of the study

¹Whereas a trend model is clearly inadequate to explain the dynamics of pharmaceutical pricing, the evaluation findings are also rather insensitive to such considerations. The estimated program effects on drug reimbursement levels are much too large and systematic to be attributed to other criteria. Curvilinear relationships including a time-squared term were also estimated from the data in several states. However, the resulting projections were sometimes implausible. E.g., price increases were occasionally projected for products with prices that declined consistently over the course of the study interval.

interval for which data had been collected. Thus, we did not have any baseline data for these products. For periods prior to federal MAC implementation, the actual per-unit and per-prescription ingredient prices paid in the states of Massachusetts, Maine, and Minnesota were averaged together and used as the projected values. For time periods subsequent to federal MAC implementation, the price projections for these states were averaged and similarly used. In all cases, differences between projected values and the actual per-unit or per-prescription reimbursement levels were taken to measure the per-unit and per-prescription savings in ingredient cost reimbursement. The per-unit and per-prescription savings estimates were then multiplied by the numbers of units and prescriptions, respectively, to obtain estimates for the total reimbursement savings in each study state. These savings estimates are reported below for each of the five initial MAC products.

5.4.1 Chlordiazepoxide HCL

Chlordiazepoxide HCl belongs to the therapeutic category of ataractic tranquilizers. Prior to patent expiration, the product was marketed exclusively by Roche under the brand name Librium. Three dosage forms of chlordiazepoxide HCl are subject to federal MAC price limitations, but Tennessee's implementation of state MAC reimbursement limits on the same product preceded the federal program (see Table 5-1 for implementation dates). Furthermore, the Tennessee MAC levels were lower than the federal ones:

<u>Dosage Form</u>	<u>Federal MAC Price</u>	<u>Tennessee MAC Price</u> ¹
5 MG CAPS	\$.0270/CAP	\$.0250/CAP
10 MG CAPS	\$.0378/CAP	\$.0310/CAP
25 MG CAPS	\$.0640/CAP	\$.0450/CAP

The estimated per-unit and per-prescription ingredient cost reimbursement savings for the most recent six-month study interval in each of the five study states are listed in Table 5-3. Projected unit costs vary across the states primarily because of pre-existing differences in generic market share--i.e., differences in the percentage of prescriptions that were already being filled with lower-price brands prior to MAC implementation. Actual unit costs vary primarily because of differences in usual and customary reimbursement and, to some extent, because of differences in the prevalence of "brand necessary" over-rides. Of course, Tennessee's MAC limit was also much lower. Differences in projected and actual prescription cost levels also reflect regional differences in average prescription size. The total estimated reimbursement savings calculated on a per-unit basis are given by state and time period in Table 5-4. Prescription-based estimates are shown in Table 5-5. In general, we believe that the per-unit estimates are the more dependable ones. Although state totals are given, they should be interpreted with caution. Because of data problems, estimates could not be developed for two time periods in Arkansas. Also, data for the most recent six-month interval were not available at the time of the pilot study in Massachusetts. In addition, reimbursement savings not reported here have been estimated for earlier time periods in Tennessee.²

¹These are the state MAC reimbursement limits prevailing at the time of federal MAC implementation. Earlier state MAC levels had been higher.

²The state of Maine also imposed MAC reimbursement limits on Chlor diazepoxide HCl tablets. However, the volume of claims for such products was quite low. We calculate that an additional \$380 was saved on a per-unit basis and that an additional \$638 was saved on a per-prescription basis.

Table 5-3

CHLORDIAZEPOXIDE HC1, 5 MG, 10 MG, and 25 MG CAPSULES:
PER-UNIT AND PER-PRESCRIPTION SAVINGS, BY STATE, MOST RECENT STUDY PERIOD¹

DESCRIPTION	STATE					AVERAGE
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	
<u>5 MG CAPSULES</u>						
Cost per Unit						
- Actual	.0239	.0258	.0261	0.0268	.0206	.0246
- Projected	.0606	.0619	.0562	0.0478	.0551	.0563
- Difference	.0367	.0361	.0301	0.0210	.0345	.0317
Cost per Prescription						
- Actual	1.7697	1.8384	1.6259	1.4892	.9085	1.5263
- Projected	4.9066	4.6717	3.5927	2.6401	2.4330	3.6488
- Difference	3.1369	2.8333	1.9668	1.1509	1.5245	2.1225
<u>10 MG CAPSULES</u>						
Cost per Unit						
- Actual	.0328	.0337	.0365	0.0335	.0233	.0320
- Projected	.0872	.0879	.0806	0.0714	.0799	.0814
- Difference	.0544	.0542	.0441	0.0379	.0566	.0494
Cost per Prescription						
- Actual	2.3866	2.3518	2.3684	1.8226	1.0447	1.9948
- Projected	6.7725	6.3295	5.3350	4.0792	3.5651	5.2162
- Difference	4.3859	3.9777	2.9666	2.2566	2.5204	3.2214
<u>25 MG CAPSULES</u>						
Cost per Unit						
- Actual	.0426	.0584	.0627	0.0520	.0335	.0498
- Projected	.1468	.1400	.1310	0.1221	.1246	.1329
- Difference	.1042	.0816	.0683	0.0701	.0911	.0831
Cost per Prescription						
- Actual	3.0826	3.6102	3.8105	2.7091	1.4607	2.9346
- Projected	12.5862	9.8033	7.8386	6.0033	5.5830	8.3629
- Difference	9.5036	6.1931	4.0281	3.2942	4.3693	5.4283

¹October 1978 - March 1979 for Massachusetts, January - June 1979 for Arkansas, and April - September 1979 for others.

Table 5-4
CHLORDIAZEPOXIDE HC1:
SAVINGS BASED ON COST PER UNIT

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>5 MG CAPSULES</u>					
Apr. '77 - Sept. '77	-	-	-	-	1,079
Oct. '77 - Mar. '78	-	-	-	-	3,176
Apr. '78 - Sept. '78	NA	1,072	6,048	343	4,301
Oct. '78 - Mar. '79	NA	2,390	9,441	1,725	4,225
Apr. '79 - Sept. '79	1,415	1,823	NA	1,945	4,172
TOTAL	1,415	5,285	15,489	4,013	16,953
<u>10 MG CAPSULES</u>					
Apr. '77 - Sept. '77	-	-	-	-	10,169
Oct. '77 - Mar. '78	-	-	-	-	30,087
Apr. '78 - Sept. '78	NA	4,937	26,334	987	39,798
Oct. '78 - Mar. '79	NA	10,449	40,649	6,001	39,492
Apr. '79 - Sept. '79	11,652	8,632	NA	6,057	37,939
TOTAL	11,652	24,018	66,983	13,045	157,485
<u>25 MG CAPSULES</u>					
Apr. '77 - Sept. '77	-	-	-	-	3,281
Oct. '77 - Mar. '78	-	-	-	-	11,155
Apr. '78 - Sept. '78	NA	2,660	10,664	713	14,425
Oct. '78 - Mar. '79	NA	4,908	16,428	1,971	14,249
Apr. '79 - Sept. '79	1,823	3,901	NA	2,431	14,604
TOTAL	1,823	11,469	27,092	5,115	57,714

NA--not available

¹ Actual time periods in Arkansas are January - June and July - December. For the sake of convenience, the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

Table 5-5

CHLORDIAZEPOXIDE HC1:
SAVINGS BASED ON COST PER PRESCRIPTION

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>5 MG CAPSULES</u>					
Apr. '77 - Sept. '77	-	-	-	-	1,025
Oct. '77 - Mar. '78	-	-	-	-	3,269
Apr. '78 - Sept. '78	NA	1,425	6,089	395	4,358
Oct. '78 - Mar. '79	NA	2,687	9,901	1,856	4,316
Apr. '79 - Sept. '79	1,634	2,006	NA	1,922	4,176
TOTAL	1,634	6,118	15,990	4,173	17,144
<u>10 MG CAPSULES</u>					
Apr. '77 - Sept. '77	-	-	-	-	9,352
Oct. '77 - Mar. '78	-	-	-	-	29,875
Apr. '78 - Sept. '78	NA	5,455	27,772	1,061	39,500
Oct. '78 - Mar. '79	NA	10,641	42,173	6,334	39,547
Apr. '79 - Sept. '79	12,921	9,065	NA	6,637	37,637
TOTAL	12,921	25,161	69,945	14,032	155,911
<u>25 MG CAPSULES</u>					
Apr. '77 - Sept. '77	-	-	-	-	3,691
Oct. '77 - Mar. '78	-	-	-	-	7,556
Apr. '78 - Sept. '78	NA	3,370	10,448	456	8,054
Oct. '78 - Mar. '79	NA	5,870	15,939	1,755	9,176
Apr. '79 - Sept. '79	2,300	4,793	NA	2,191	6,771
TOTAL	2,300	14,033	26,387	4,402	35,248

NA--not available

¹ Actual time periods in Arkansas are January - June and July - December. For the sake of convenience, the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

5.4.2 Propoxyphene HCl

Propoxyphene HCl belongs to the therapeutic category of non-narcotic analgesics. The largest-selling product groups in this category are propoxyphene HCl and compound, propoxyphene napsylate and compound, butalbital w/APC, and pentazocine. Prior to patent expiration, propoxyphene HCl was marketed exclusively by Lilly under the brand name Darvon. Two dosage forms of propoxyphene HCl have become subject to federal MAC reimbursement limitations. Whereas Tennessee had implemented a state MAC limit on simple propoxyphene considerably earlier, Propoxyphene compound is not included in the Tennessee formulary and is not reimbursable in that state. Arkansas has more recently introduced state MAC limits, on both simple propoxyphene and propoxyphene compound. While the Arkansas MAC levels were somewhat higher than the federal limits, the Tennessee MAC limit on simple propoxyphene is lower than the federal one.

<u>Dosage Form</u>	<u>Federal MAC Price</u>	<u>Tennessee MAC Price</u> ¹	<u>Arkansas MAC Price</u>
65 MG	\$.0317/CAP	\$.025/CAP	\$.036/CAP
65 MG CMPD	\$.0330/CAP	—	\$.040/CAP

The per-unit and per-prescription ingredient cost reimbursement savings estimated for the most recent six-month study interval in each of four study states are given in Table 5-6. We have not developed independent estimates for Tennessee; the Tennessee MAC had been implemented prior to the beginning of the period for which data were collected. Thus, we did not have baseline data and it was not possible to estimate the savings level using trend analysis. For periods prior to federal MAC implementation the actual per-unit and per-prescription ingredient prices paid in the states of

¹Level prevailing at time of federal MAC implementation.

Table 5-6

PROPOXYPHENE HC1:

PER-UNIT AND PER-PRESCRIPTION SAVINGS, BY STATE, MOST RECENT STUDY PERIOD¹

DESCRIPTION	STATE					AVERAGE ³
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee ²	
65 MG CAPSULES						
Cost per Unit						
- Actual	.0292	.0288	.0305	0.0379	.0216	.0316
- Projected	.0651	.0633	.0607	0.0688	NA	.0645
- Difference	.0359	.0345	.0302	0.0309	NA	.0329
Cost per Prescription						
- Actual	1.7917	1.6106	1.7923	1.8238	.7023	1.7546
- Projected	3.3137	3.9030	3.8770	3.1776	NA	3.5678
- Difference	1.5220	2.2924	2.0847	1.3538	NA	1.8132
65 MG COMPOUND CAPSULES						
Cost per Unit						
- Actual	.0325	.0307	.0319	0.0353	Not Applicable	.0326
- Projected	.0728	.0825	.0669	0.0695	Not Applicable	.0729
- Difference	.0403	.0518	.0350	0.0342		.0403
Cost per Prescription						
- Actual	1.9286	1.6392	1.7245	1.6108	Not Applicable	1.7258
- Projected	3.4926	4.5094	3.7441	3.4747	Not Applicable	3.8052
- Difference	1.5640	2.8702	2.0196	1.8639		2.0794

NA--not available

¹October 1978 - March 1979 for Massachusetts, January - June 1979 for Arkansas, and April - September 1979 for others.

²Propoxyphene compound is not included in the Tennessee formulary.

³Tennessee is not included.

Massachusetts, Maine, and Minnesota were averaged together and used for the comparison. For time periods subsequent to federal MAC implementation, the price projections for these states were averaged and similarly used.²

The total estimated reimbursement savings calculated on a per-unit basis are given by state and time period in Table 5-7. Prescription-based estimates are shown in Table 5-8.¹

5.4.3 Ampicillin

Ampicillin belongs to the penicillin therapeutic category. The three largest-selling products in this category are ampicillin, penicillin VK, and penicillin G potassium. Four dosage forms of ampicillin became subject to federal MAC price limitations. State MAC reimbursement limits had earlier been adopted in Tennessee and Arkansas. The Tennessee limits were either the same or lower than the federal limits for all dosage forms. The Arkansas limits were higher than the federal ones.

<u>Dosage Form</u>	<u>Federal MAC²</u> <u>Limit</u>	<u>Tennessee</u> <u>MAC Limit</u>	<u>Arkansas</u> <u>MAC Limit</u>
250 MG CAP	\$.0725/CAP	\$.068/CAP	\$.08/CAP
500 MG CAP	\$.1390/CAP	\$.135/CAP	\$.15/CAP
125 MG LIQ	\$.0145/CC	\$.0145/CC	\$.0165/CC
250 MG LIQ	\$.0205/CC	\$.020/CC	\$.227/CC

The estimated per-unit and per-prescription ingredient cost reimbursement savings for the most recent six-month study interval in each study state except Tennessee are given in Table 5-9. Here again, lack of baseline data meant that independent estimates could not be developed for Tennessee. The reader will note that a MAC-related increase in ampicillin reimbursement

¹Savings were also projected in Tennessee for earlier time periods not shown in Tables 5-7 and 5-8.

²On March 26, 1979 the federal MAC reimbursement limits were reduced to \$.0595 and \$.1103, respectively, for 250 MG and 500 MG capsules.

Table 5-7

PROPOXYPHENE HC1:
SAVINGS BASED ON COST PER UNIT

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>65 MG CAPSULES</u>					
Apr. '77 - Sept. '77	2,929	-	-	-	57,476
Oct. '77 - Mar. '78	2,586	-	-	-	53,200
Apr. '78 - Sept. '78	4,056	6,961	12,765	4,278	57,076
Oct. '78 - Mar. '79	4,085	7,491	19,315	5,853	50,001
Apr. '79 - Sept. '79	3,679	5,499	NA	4,729	41,168
TOTAL	17,335	19,951	32,080	14,860	258,921
<u>65 MG COMPOUND</u>					
Apr. '78 - Sept. '78	15,152	6,508	25,436	11,135	Not Applicable
Oct. '78 - Mar. '79	16,059	5,995	37,729	13,326	
Apr. '79 - Sept. '79	16,189	4,129	NA	11,405	
TOTAL	47,400	16,632	63,165	35,866	

NA--not available

¹ Actual time periods in Arkansas are January - June and July - December. For the sake of convenience, the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

Table 5-8

PROPOXYPHENE HC1:
SAVINGS BASED ON COST PER PRESCRIPTION

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>65 MG CAPSULES</u>					
Apr. '77 - Sept. '77	1,990	-	-	-	117,225
Oct. '77 - Mar. '78	1,711	-	-	-	106,573
Apr. '78 - Sept. '78	2,952	9,088	15,428	3,213	113,068
Oct. '78 - Mar. '79	3,196	9,267	22,657	4,975	100,885
Apr. '79 - Sept. '79	2,543	6,540	NA	4,306	88,625
TOTAL	12,392	24,895	38,085	12,494	526,376
<u>65 MG COMPOUND</u>					
Apr. '78 - Sept. '78	10,476	6,276	27,382	15,060	Not Applicable
Oct. '78 - Mar. '79	11,563	5,695	40,218	16,552	
Apr. '79 - Sept. '79	10,577	4,285	NA	13,625	
TOTAL	32,616	16,256	67,600	45,237	

NA--not available

¹ October 1978 - March 1979 for Massachusetts, January - June 1979 for Arkansas, and April - September 1979 for others.

Table 5-9

AMPICILLIN, 250 MG and 500 MG CAPSULES:
PER-UNIT AND PER-PRESCRIPTION SAVINGS, BY STATE, MOST RECENT STUDY PERIOD¹

DESCRIPTION	STATE					AVERAGE ²
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	
250 MG CAPSULES						
Cost per Unit						
- Actual	.0612	.0572	.0673	0.0554	.0506	.0603
- Projected	.1346	.1053	.0604	0.0737	NA	.0935
- Difference	.0734	.0481	(.0069)	0.0183	NA	.0332
Cost per Prescription						
- Actual	1.9322	2.0081	2.2190	1.9431	1.5437	2.0081
- Projected	3.3621	3.5975	2.0524	2.4617	NA	2.8684
- Difference	1.4299	1.6594	(.1666)	0.5186	NA	0.8603
500 MG CAPSULES						
Cost per Unit						
- Actual	.1158	.1085	.1315	0.1022	.1002	.1145
- Projected	.2554	.1193	.1122	0.1706	NA	.1644
- Difference	.1396	.0108	(.0193)	0.0684	NA	.0499
Cost per Prescription						
- Actual	3.5223	3.5562	4.2906	3.3066	2.8165	3.6689
- Projected	6.6647	4.6126	4.0241	4.6519	NA	4.9883
- Difference	3.1424	1.0564	(.2665)	1.3453	NA	1.3194

NA--not available

¹October 1978 - March 1979 for Massachusetts, January - June 1979 for Arkansas, and April - September 1979 for others.

²Tennessee is not included.

Table 5-9 (con't)

**AMPICILLIN, 125 MG and 250 MG LIQUID:
PER-UNIT AND PER-PRESCRIPTION SAVINGS, BY STATE, MOST RECENT STUDY PERIOD¹**

DESCRIPTION	STATE					AVERAGE ²
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	
<u>125 MG LIQUID</u>						
Cost per Unit						
- Actual	.0139	.0130	.0251	0.0121	.0050	.0160
- Projected	.0176	.0158	.0228	0.0127	NA	.0172
- Difference	.0037	.0028	(.0023)	0.0006	NA	.0012
Cost per Prescription						
- Actual	1.7797	2.0182	NA	1.9377	1.4492	1.9119
- Projected	2.0197	2.5816	NA	2.0812	NA	2.2275
- Difference	0.2400	0.5634	NA	0.1435	NA	0.3156
<u>250 MG LIQUID</u>						
Cost per Unit						
- Actual	.0201	.0194	.0386	0.0175	.0111	.0239
- Projected	.0272	.0237	.0368	0.0169	NA	.0262
- Difference	.0071	.0043	(.0018)	(0.0006)	NA	.0023
Cost per Prescription						
- Actual	3.2221	3.0620	NA	2.9782	2.3480	3.0874
- Projected	3.8021	3.9324	NA	3.0444	NA	3.5930
- Difference	0.5800	0.8704	NA	0.0662	NA	0.5056

NA--not available

¹October 1978 - March 1979 for Massachusetts, January - June 1979 for Arkansas, and April - September 1979 for others.

²Tennessee is not included.

levels was projected in Massachusetts. This happens because the state inappropriately raised the reimbursement level for miscellaneous ampicillin to the MAC level. The total estimated reimbursement savings calculated on a per-unit basis are shown by state and study period in Table 5-10; prescription-based estimates are given in Table 5-11. Due to the improper implementation of the Massachusetts program, a MAC-related loss on reimbursement for ampicillin is projected in that state. Furthermore, the reimbursement savings in Arkansas may be understated due to data-related problems.¹

5.4.4 Penicillin VK

Four dosage forms of penicillin VK are subject to federal MAC reimbursement limitations. Both Arkansas and Tennessee had previously implemented MACs on these dosage forms. Except for 250 MG liquid, the Tennessee limits are either the same as or lower than the federal ones; the Arkansas MAC limits were either the same or higher.

<u>Dosage Form</u>	<u>Federal MAC Limit</u>	<u>Tennessee MAC Limit</u>	<u>Arkansas MAC Limit</u>
250 MG TAB	\$.0535/TAB	\$.0530/TAB	\$.06/TAB
500 MG TAB	\$.1025/TAB	\$.1025/TAB	\$.12/TAB
125 MG LIQ	\$.0120/CC	\$.0120/CC	\$.0120/CC
250 MG LIQ	\$.0150/CC	\$.0160/CC	\$.0170/CC

The estimated per-unit and per-prescription ingredient cost reimbursement savings for the most recent six-month study interval in each study state are given in Table 5-12. MAC-related increases in reimbursement levels are also found with respect to penicillin VK in Massachusetts. As with ampicillin, the state had also raised the reimbursement price for nonbranded penicillin VK to the MAC level. MAC-related reimbursement losses

¹The drug utilization data on Polycillin brand liquids could not be used.

Table 5-10

AMPICILLIN:
SAVINGS BASED ON COST PER UNIT

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>250 MG CAPSULES</u>					
Apr. '77 - Sept. '77	11,374	2,475	-	-	15,905
Oct. '77 - Mar. '78	10,587	5,778	-	3,660	16,205
Apr. '78 - Sept. '78	16,520	4,570	(3,183)	4,159	13,872
Oct. '78 - Mar. '79	13,408	5,244	(3,657)	3,187	13,667
Apr. '79 - Sept. '79	20,190	5,290	NA	3,895	10,084
TOTAL	72,079	23,357	(6,840)	14,901	69,733
<u>500 MG CAPSULES</u>					
Apr. '77 - Sept. '77	13,007	1,166	-	-	14,181
Oct. '77 - Mar. '78	13,442	2,681	-	4,132	15,568
Apr. '78 - Sept. '78	20,062	1,623	(5,390)	5,115	12,067
Oct. '78 - Mar. '79	16,325	909	(6,370)	5,512	12,126
Apr. '79 - Sept. '79	26,372	592	NA	6,837	8,807
TOTAL	89,208	6,971	(11,760)	21,596	62,749
<u>125 MG LIQUID</u>					
Apr. '77 - Sept. '77	1,305	-	-	-	5,850
Oct. '77 - Mar. '78	1,522	396	-	420	(459)
Apr. '78 - Sept. '78	2,678	264	(1,016)	613	1,701
Oct. '78 - Mar. '79	1,539	570	(1,334)	424	2,944
Apr. '79 - Sept. '79	1,783	414	NA	236	7,914
TOTAL	8,827	1,644	(2,350)	1,693	17,950
<u>250 MG LIQUID</u>					
Apr. '77 - Sept. '77	3,647	-	-	-	11,442
Oct. '77 - Mar. '78	2,756	2,602	-	283	(1,610)
Apr. '78 - Sept. '78	4,811	1,649	(859)	643	(761)
Oct. '78 - Mar. '79	2,296	2,239	(2,346)	(147)	5,882
Apr. '79 - Sept. '79	3,210	1,511	NA	(384)	7,891
TOTAL	16,720	8,001	(3,205)	395	22,844

NA--not available

¹ Actual time periods in Arkansas are January - June and July - December. For the sake of convenience, the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

Table 5-11

AMPICILLIN:
SAVINGS BASED ON COST PER PRESCRIPTION

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>250 MG CAPSULES</u>					
Apr. '77 - Sept. '77	7,593	1,890	-	-	19,808
Oct. '77 - Mar. '78	7,586	5,621	-	3,849	22,162
Apr. '78 - Sept. '78	13,155	4,384	(2,906)	4,230	18,510
Oct. '78 - Mar. '79	9,416	5,566	(2,680)	3,194	19,838
Apr. '79 - Sept. '79	12,457	5,390	NA	3,151	13,513
TOTAL	50,207	22,851	(5,586)	14,424	93,831
<u>500 MG CAPSULES</u>					
Apr. '77 - Sept. '77	9,136	705	-	-	23,732
Oct. '77 - Mar. '78	8,984	2,942	-	2,845	24,215
Apr. '78 - Sept. '78	13,694	2,098	(3,339)	3,316	19,935
Oct. '78 - Mar. '79	12,095	1,659	(2,696)	3,135	21,075
Apr. '79 - Sept. '79	19,511	1,766	NA	4,157	15,935
TOTAL	63,420	9,170	(6,035)	13,453	104,892
<u>125 MG LIQUID</u>					
Apr. '77 - Sept. '77	567	-	-	-	2,789
Oct. '77 - Mar. '78	891	400	-	354	4,213
Apr. '78 - Sept. '78	1,887	348	NA	502	3,557
Oct. '78 - Mar. '79	931	803	NA	565	4,059
Apr. '79 - Sept. '79	901	536	NA	354	2,599
TOTAL	5,177	2,087	NA	1,775	17,217
<u>250 MG LIQUID</u>					
Apr. '77 - Sept. '77	2,600	-	-	-	7,339
Oct. '77 - Mar. '78	1,979	2,515	-	555	8,047
Apr. '78 - Sept. '78	3,177	1,844	NA	1,039	6,523
Oct. '78 - Mar. '79	1,362	2,688	NA	771	7,172
Apr. '79 - Sept. '79	1,635	1,940	NA	249	4,614
TOTAL	10,753	8,987	NA	2,614	33,695

NA--not available

¹ Actual time periods in Arkansas are January - June and July - December. For the sake of convenience the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

Table 5-12

PENICILLIN VK, 250 MG and 500 MG CAPSULES:
PER-UNIT AND PER-PRESCRIPTION SAVINGS, BY STATE, MOST RECENT STUDY PERIOD¹

DESCRIPTION	STATE					AVERAGE
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	
<u>250 MG CAPSULES</u>						
Cost per Unit						
- Actual	.0499	.0458	.0497	0.0429	.0413	.0459
- Projected	.0902	.0787	.0506	0.0636	.0664	.0699
- Difference	.0403	.0329	.0009	0.0207	.0251	.0240
Cost per Prescription						
- Actual	1.5773	1.5727	1.6020	1.4144	1.1487	1.4630
- Projected	2.5336	2.7607	1.6682	2.1145	1.8442	2.1842
- Difference	0.9563	1.1880	.0662	0.7001	.6955	0.7212
<u>500 MG CAPSULES</u>						
Cost per Unit						
- Actual	.0887	.0944	.0986	.0847	.0870	.0907
- Projected	.1728	.1555	.1068	.1282	.1484	.1423
- Difference	.0841	.0611	.0082	.0435	.0614	.0516
Cost per Prescription						
- Actual	2.3636	2.9958	2.8566	2.4455	2.2612	2.5845
- Projected	4.0465	5.0888	3.3518	3.5573	4.0421	4.0173
- Difference	1.6829	2.0930	0.4952	1.1118	1.7809	1.4328

NA--not available

¹ October 1978 - March 1979 for Massachusetts, January - June 1979 for Arkansas, and April - September 1979 for others.

Table 5-12 (con't)

PENICILLIN VK, 125 MG and 250 MG LIQUID:
 PER-UNIT AND PER-PRESCRIPTION SAVINGS, BY STATE, MOST RECENT STUDY PERIOD¹

DESCRIPTION	STATE					AVERAGE
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	
<u>125 MG LIQUID</u>						
Cost per Unit						
- Actual	.0117	.0110	.0195	.0110	.0129	.0132
- Projected	.0160	.0141	.0189	.0126	.0176	.0158
- Difference	.0043	.0031	(.0006)	.0016	.0047	.0026
Cost per Prescription						
- Actual	1.4826	1.7015	NA	1.6495	1.3916	1.5563
- Projected	1.8715	2.2429	NA	1.8374	1.7636	1.9289
- Difference	0.3889	0.5414	NA	0.1879	0.3720	0.3726
<u>250 MG LIQUID</u>						
Cost per Unit						
- Actual	.0150	.0194	.0304	.0139	.0201	.0198
- Projected	.0190	.0237	.0283	.0167	.0257	.0227
- Difference	.0040	.0043	(.0021)	.0028	.0056	.0029
Cost per Prescription						
- Actual	2.2127	2.3523	NA	2.2496	1.9891	2.2009
- Projected	2.8446	2.8408	NA	2.5621	2.6397	2.7218
- Difference	0.6319	0.4885	NA	0.3125	0.6506	0.5209

NA--not available

¹October 1978 - March 1979 for Massachusetts, January - June 1979 for Arkansas, and April - September 1979 for others.

in Massachusetts are thus also indicated for penicillin. The total estimated reimbursement savings calculated on a per-unit basis are depicted by state and study period in Table 5-13. Prescription-based estimates are found in Table 5-14.

5.4.5 Tetracycline HCl

Tetracycline HCl belongs to the therapeutic category of broad- and medium-spectrum antibiotics. Two dosage forms of tetracycline became subject to federal MAC price limitations, again after Tennessee and Arkansas had already set state MAC reimbursement limits on these products. The Tennessee limits were the same or lower than the federal limits, and the Arkansas limits were higher.

Dosage Form	Federal MAC Limit	Tennessee MAC Limit ¹	Arkansas MAC Limit
250 MG CAP	\$.0250/CAP	\$.025/CAP	\$.0325/CAP
500 MG CAP	\$.0465/CAP	\$.04/CAP	\$.050/CAP

The estimated per-unit and per-prescription ingredient cost reimbursement savings for the most recent six-month study interval in each study state except Tennessee are shown in Table 5-15. Lack of baseline data meant that independent estimates could not be developed for Tennessee. Furthermore, increased reimbursement levels are again found in Massachusetts due to improper application of the MAC limits to nonbranded tetracycline, formerly reimbursed at a lower level. The total estimated reimbursement savings calculated on a per-unit basis are shown by state and study period in Table 5-16. The prescription-based estimates are presented in Table 5-17. MAC-related losses are again projected for Massachusetts.

¹ Levels prevailing at time of federal MAC implementation.

Table 5-13
PENICILLIN VK:
SAVINGS BASED ON COST PER UNIT

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>250 MG CAPSULES</u>					
Apr. '77 - Sept. '77	4,925	-	-	-	4,160
Oct. '77 - Mar. '78	4,676	3,872	-	4,177	7,872
Apr. '78 - Sept. '78	7,253	4,493	(503)	6,799	8,503
Oct. '78 - Mar. '79	6,344	5,958	935	7,325	9,234
Apr. '79 - Sept. '79	8,158	5,623	NA	6,310	6,802
TOTAL	31,356	19,946	432	24,551	36,571
<u>500 MG CAPSULES</u>					
Apr. '77 - Sept. '77	4,101	-	-	-	2,025
Oct. '77 - Mar. '78	3,547	946	-	1,177	4,649
Apr. '78 - Sept. '78	5,160	1,220	598	1,930	5,138
Oct. '78 - Mar. '79	4,609	1,332	850	2,167	6,371
Apr. '79 - Sept. '79	6,070	1,481	NA	2,324	5,380
TOTAL	23,487	4,979	1,448	7,598	23,563
<u>125 MG LIQUID</u>					
Apr. '77 - Sept. '77	955	-	-	-	357
Oct. '77 - Mar. '78	900	346	-	269	809
Apr. '78 - Sept. '78	1,250	238	7	387	744
Oct. '78 - Mar. '79	1,013	390	(268)	551	1,288
Apr. '79 - Sept. '79	1,192	408	NA	438	851
TOTAL	5,310	1,382	(261)	1,645	4,049
<u>250 MG LIQUID</u>					
Apr. '77 - Sept. '77	571	-	-	-	363
Oct. '77 - Mar. '78	737	657	-	495	984
Apr. '78 - Sept. '78	1,379	625	(988)	983	2,357
Oct. '78 - Mar. '79	957	1,152	(3,478)	1,388	3,347
Apr. '79 - Sept. '79	920	1,511	NA	1,518	2,361
TOTAL	4,564	3,945	(4,466)	4,384	9,412

NA--not available

¹ Actual time periods in Arkansas are January - June and July - December. For the sake of convenience the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

Table 5-14

PENICILLIN VK:
SAVINGS BASED ON COST PER PRESCRIPTION

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>250 MG CAPSULES</u>					
Apr. '77 - Sept. '77	3,315	-	-	-	3,691
Oct. '77 - Mar. '78	3,313	3,669	-	4,429	7,556
Apr. '78 - Sept. '78	6,038	4,114	716	7,025	8,054
Oct. '78 - Mar. '79	4,780	5,690	2,135	7,203	9,176
Apr. '79 - Sept. '79	6,122	5,910	NA	6,473	6,771
TOTAL	23,568	19,383	2,851	25,130	35,248
<u>500 MG CAPSULES</u>					
Apr. '77 - Sept. '77	3,235	-	-	-	2,032
Oct. '77 - Mar. '78	2,941	997	-	704	4,978
Apr. '78 - Sept. '78	4,250	1,383	1,357	1,827	5,412
Oct. '78 - Mar. '79	3,742	1,700	1,772	1,876	7,088
Apr. '79 - Sept. '79	4,559	1,599	NA	2,057	6,007
TOTAL	18,727	5,679	3,129	6,464	25,517
<u>125 MG LIQUID</u>					
Apr. '77 - Sept. '77	1,039	-	-	-	110
Oct. '77 - Mar. '78	865	399	NA	191	329
Apr. '78 - Sept. '78	1,351	287	NA	403	482
Oct. '78 - Mar. '79	879	399	NA	425	1,013
Apr. '79 - Sept. '79	849	460	NA	343	626
TOTAL	4,983	1,545	NA	1,362	2,560
<u>250 MG LIQUID</u>					
Apr. '77 - Sept. '77	612	-	-	-	501
Oct. '77 - Mar. '78	833	472	NA	622	1,023
Apr. '78 - Sept. '78	1,548	475	NA	963	2,093
Oct. '78 - Mar. '79	963	948	NA	1,028	3,784
Apr. '79 - Sept. '79	983	1,031	NA	1,045	2,782
TOTAL	4,939	2,926	NA	3,658	10,183

NA--not available

¹ Actual time periods in Arkansas are January - June and July - December. For the sake of convenience the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

Table 5-15

TETRACYCLINE HCL, 250 MG and 500 MG CAPSULES:
PER-UNIT AND PER-PRESCRIPTION SAVINGS, BY STATE, MOST RECENT STUDY PERIOD¹

DESCRIPTION	STATE					AVERAGE ²
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	
<u>250 MG CAPSULES</u>						
Cost per Unit						
- Actual	.0261	.0190	.0215	0.0240	.0255	.0227
- Projected	.0409	.0395	.0175	0.0282	N/A	.0315
- Difference	.0148	.0205	(.0040)	0.0042	N/A	.0088
Cost per Prescription						
- Actual	0.9041	0.8729	0.9928	1.1142	0.6184	0.9710
- Projected	1.2082	1.7556	0.9283	1.3109	NA	1.3008
- Difference	0.3041	0.8827	(.0645)	0.1967	NA	0.3298
<u>500 MG CAPSULES</u>						
Cost per Unit						
- Actual	.0516	.0393	.0424	0.0424	.0389	.0439
- Projected	.0768	.0749	.0290	0.0547	NA	.0589
- Difference	.0252	.0356	(.0134)	0.0123	NA	.0150
Cost per Prescription						
- Actual	1.4416	1.3404	1.6578	1.5217	.8896	1.4904
- Projected	1.7839	2.4749	1.4082	1.8821	NA	1.8873
- Difference	0.3423	1.1345	(.2496)	0.3604	NA	0.3969

NA--not available

¹ October 1978 - March 1979 for Massachusetts, January - June 1979 for Arkansas, and April - September 1979 for others.

² Tennessee is not included.

Table 5-16

TETRACYCLINE HC1:
SAVINGS BASED ON COST PER UNIT

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>250 MG</u>					
Apr. '77 - Sept. '77	2,848	-	-	-	6,748
Oct. '77 - Mar. '78	2,581	-	-	-	9,448
Apr. '78 - Sept. '78	4,995	2,465	(3,550)	1,844	7,013
Oct. '78 - Mar. '79	4,251	3,677	(3,958)	2,412	6,798
Apr. '79 - Sept. '79	5,324	3,476	NA	1,455	5,921
TOTAL	19,999	9,618	(7,508)	5,711	35,928
<u>500 MG</u>					
Apr. '77 - Sept. '77	1,492	-	-	-	3,406
Oct. '77 - Mar. '78	1,333	-	-	-	3,850
Apr. '78 - Sept. '78	1,921	524	(1,242)	848	3,088
Oct. '78 - Mar. '79	2,052	612	(2,081)	1,164	2,775
Apr. '79 - Sept. '79	2,487	603	NA	1,032	1,514
TOTAL	9,285	1,739	(3,323)	3,044	14,633

NA--not available

¹Actual time periods in Arkansas are January - June and July - December. For the sake of convenience the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

Table 5-17

TETRACYCLINE HC1:
SAVINGS BASED ON COST PER PRESCRIPTION

PERIOD ¹	STATE				
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee
<u>250 MG</u>					
Apr. '77 - Sept. '77	1,793	-	-	-	19,327
Oct. '77 - Mar. '78	1,411	-	-	-	23,532
Apr. '78 - Sept. '78	3,326	2,125	(2,416)	1,859	19,875
Oct. '78 - Mar. '79	2,546	3,417	(1,382)	2,586	21,191
Apr. '79 - Sept. '79	3,164	3,249	- NA	1,468	13,140
TOTAL	12,240	8,791	(3,798)	5,913	97,065
<u>500 MG</u>					
Apr. '77 - Sept. '77	678	-	-	-	6,777
Oct. '77 - Mar. '78	599	-	-	-	8,257
Apr. '78 - Sept. '78	957	487	(946)	526	7,065
Oct. '78 - Mar. '79	1,055	611	(992)	1,187	7,648
Apr. '79 - Sept. '79	1,210	563	NA	843	5,566
TOTAL	4,499	1,661	(1,938)	2,556	35,313

NA--not available

¹ Actual time periods in Arkansas are January - June and July - December. For the sake of convenience the Arkansas data for January - June are reported as April - September and those for July - December are reported as October - March.

5.4.6 Conclusion

The projected annual reimbursement savings for each of the 15 initial MAC product-dosage forms in each study state is shown in Table 5-18. These annual estimates were obtained simply by doubling the estimates developed for the most recent six-month study interval. The total reimbursement savings achieved in all five study states is also given for each MAC product. Reimbursement savings were greatest for chlordiazepoxide and propoxyphene, approximately \$300,000 each per year, and smallest for tetracycline, about \$30,000 per year. The total estimated savings on the 15 initial MAC product dosage forms amounts to \$925,000 per year in the five study states.¹

Although the state sample size is admittedly too small to reliably extrapolate the above savings estimates to the national level, it is nevertheless possible to develop a very crude estimate of the reimbursement savings being achieved nationwide. Unfortunately, we do not have information on the national Medicaid prescription volume by product--e.g., the number of 65 MG propoxyphene prescriptions being dispensed to Medicaid recipients in all states. Therefore, our approach is somewhat indirect. The estimated reimbursement savings is nearly one percent of total Medicaid drug reimbursement expense in the five states. If the same level of savings were achieved by Medicaid drug programs in other states, almost eleven million dollars per

¹This savings in drug reimbursement is offset by a reduction in tax revenue to federal, state and local governments. Based on unpublished 1970 ORS/SSA data, the average tax rate on net earnings--total revenue less production and administrative costs--in the pharmaceutical industry is 18.4 percent. If so, the net governmental savings amounts to something more than \$700,000. However, it is not clear that the tax loss is a cost that should be attributed to the program. Taxes are merely transfer payments within the society-at-large and do not constitute a real cost from the taxpayer's perspective.

Table 5-18

PROJECTED ANNUAL REIMBURSEMENT SAVINGS ON THE FIVE INITIAL
MAC PRODUCTS, BY STATE

Product	STATE					Total
	Arkansas	Maine	Massachusetts	Minnesota	Tennessee	
Chlordiazepoxide HC1						
5 MG CAPS	\$ 2,830	\$ 3,646	\$ 18,882	\$ 3,890	\$ 8,334	\$ 37,592
10 MG CAPS	23,304	17,264	81,298	12,114	75,878	209,858
25 MP CAPS	3,646	7,802	32,856	4,862	29,208	78,374
						\$325,824
Propoxyphene HC1						
65 MG CAPS	7,358	10,998	38,630	9,458	82,336	148,780
65 MG CMPD CAPS	32,378	8,258	75,458	22,810	NA	138,904
						\$287,684
Ampicillin						
250 MG CAPS	40,380	10,580	(7,314)	7,790	20,168	71,604
500 MG CAPS	52,744	1,184	(12,740)	13,674	17,614	72,476
125 MG LIQ	3,566	828	(2,668)	472	15,828	18,026
250 MG LIQ	6,420	3,022	(4,692)	(768)	15,782	19,764
						\$181,870
Penicillin VK						
250 MG CAPS	16,316	11,246	1,870	12,620	13,604	55,656
500 MG CAPS	12,140	2,962	1,700	4,648	10,760	32,210
125 MG LIQ	2,384	816	(536)	876	1,702	5,242
250 MG LIQ	1,840	3,022	(6,956)	3,036	4,722	5,664
						\$ 98,772
Tetracycline HC1						
250 MG CAPS	10,648	6,952	(7,916)	2,910	11,842	24,436
500 MG CAPS	4,974	1,206	(4,162)	2,064	3,028	7,110
						\$ 31,546
TOTAL	220,928	89,786	203,710	100,456	310,816	925,696
Percent of Total Medicaid Drug Reimbursement Expense	1.40	1.26	0.73	0.54	1.01	0.99

year is being saved nationwide on the first five MAC products alone. The estimated rates of reimbursement savings range from 0.54 percent of drug program cost in Minnesota to 1.40 percent in Arkansas. Using this range of estimates, the savings achieved nationwide might be estimated to range between six and fifteen million dollars.

5.5 EAC-Related Savings

Arkansas, Minnesota, and Tennessee have not changed their drug reimbursement programs in response to the EAC requirement that allowable ingredient cost reimbursement equal the estimated acquisition cost. The pre-existing actual acquisition cost approach to determining ingredient cost reimbursement in Tennessee clearly satisfies the EAC requirement. Furthermore, the approach to ingredient cost reimbursement in Minnesota, using local wholesale prices, probably also satisfies the EAC requirement. However, it is doubtful that the approach to ingredient cost reimbursement in Arkansas, primarily using average wholesale prices (AWP), conforms to the regulation's requirements. Although no savings can be attributed to EAC in Minnesota and Tennessee, additional EAC-related savings probably could be achieved in Arkansas if the state decided to comply with the EAC requirement.

As discussed in Section 5.2, both Massachusetts and Maine have changed their drug reimbursement programs in response to the EAC requirement. Massachusetts is now using volume wholesale prices for 20 non-MAC products, direct prices for 42 additional non-MAC products, and AWP less five percent for all other products. Maine has adopted volume wholesale prices for 87 products and direct prices for 61 products. The EAC-related reimbursement cost savings in these two states were estimated by EAC product category, using the same projection methodology as was used in estimating the MAC-related savings (see Section 5.4). For the most recent six-month

study interval the estimated per-unit and per-prescription ingredient cost reimbursement savings by EAC product category and state are shown in Table 5-19. The total estimated reimbursement savings calculated both on a per-unit and per-prescription basis are shown by state, EAC product category and study interval in Table 5-20. Annual savings estimates are also given; they were obtained by simply doubling the estimates for the most recent six-month time interval. The total annual EAC-related reimbursement savings amounts to about two million dollars in Massachusetts and between \$300,000 and \$400,000 in Maine. Of course, it is not possible to extrapolate these findings to the nation in any meaningful fashion.

5.6 Administrative Costs

The costs of implementing and operating the MAC program at the federal and state levels comprise the programs' administrative costs. This section estimates these costs.

5.6.1 Federal Costs

Estimates of the costs incurred by the federal government in implementing and operating the MAC program are shown in Table 5-21. Given the assumptions discussed below, we estimate that the total federal program costs were just under three million dollars during the five-year period from 1975 through 1979. Approximately 60 percent of this amount was spent on MAC and FDA staff labor and travel, while advisory committee and consultant costs accounted for another two percent. The remaining 38 percent is attributable to the MAC program's prorated share of data-related contracts.

It is difficult to distinguish between the federal costs associated with program implementation and those associated with program operations. Implementation has taken place gradually. However, Table 5-21 indicates that

Table 5-19

EAC-RELATED SAVINGS:
PER-UNIT AND PER-PRESCRIPTION SAVINGS,
MAINE AND MASSACHUSETTS, MOST RECENT STUDY PERIOD¹

DESCRIPTION	EAC COMPLIANCE APPROACH		
	Volume Wholesale	Direct	AWP Less 5 Percent
<u>Maine²</u>			
Cost per Unit			
- Actual	.0818	.0863	
- Projected	.0832	.1043	NA
- Difference	.0014	.0180	
Cost per Prescription			
- Actual	4.9115	5.1501	
- Projected	5.3651	6.4819	NA
- Difference	.4536	1.3318	
<u>Massachusetts</u>			
Cost per Unit			
- Actual	.0817	.0779	
- Projected	.0854	.0909	NA
- Difference	.0037	.0130	
Cost per Prescription			
- Actual	4.1883	5.7922	5.17
- Projected	4.4235	6.7471	5.58
- Difference	.2352	.9549	.41

NA--not available

¹October 1978 - March 1979 for Massachusetts, and April - September 1979 for Maine.

²Tablets only. See Technical Appendix for non-tablet data.

Table 5-20

EAC-RELATED SAVINGS:
TOTAL SAVINGS BASED ON COST PER UNIT AND COST PER PRESCRIPTION
MAINE AND MASSACHUSETTS

PERIOD	STATE				
	Maine ¹		Massachusetts		
	Volume Wholesale	Direct	Volume Wholesale	Direct	
<u>Cost Per Unit</u>					
Oct. '78 - Mar. '79	\$ 31,272	\$ 49,520	\$ 72,882	\$281,547	NA
Apr. '79 - Sept. '79	55,182	94,955	NA	NA	NA
ANNUAL PROJECTION	\$110,364	\$189,910	\$145,764	\$563,094	NA
<u>Cost Per Prescription</u>					
Oct. '78 - Mar. '79	\$ 44,934	\$ 71,526	\$ 90,348	\$278,159	\$656,718
Apr. '79 - Sept. '79	83,970	124,458	NA	NA	NA
ANNUAL PROJECTION	\$167,940	\$248,916	\$180,696	\$556,318	\$1,313,436

NA--not available

¹ Includes both tablets and non-tablets.

Table 5-21

MAC PROGRAM COSTS TO THE FEDERAL GOVERNMENT

	1975	1976	1977	1978	1979	All Years
<u>LABOR</u>						
MAC Personnel & Board (FTEs)	95,783 (3.27)	206,072 (6.79)	138,316 (4.19)	77,899 (2.91)	86,530 (3.23)	604,600 (20.39)
FDA Personnel (FTEs)	-	22,957 (0.83)	58,980 (2.0)	62,226 (2.0)	66,582 (2.0)	210,745 (6.83)
TOTAL LABOR (FTEs)	95,783 (3.27)	229,029 (7.62)	197,296 (6.19)	140,125 (4.91)	153,112 (5.23)	815,345 (27.22)
<u>FRINGE:</u>						
retirement (20.4%)	19,540	46,722	40,248	28,586	31,235	166,331
insurance (3.7%)	3,544	8,474	7,300	5,185	5,665	30,168
workmen's compensa- tion (1.9%)	1,820	4,352	3,749	2,662	2,909	15,492
LABOR PLUS FRINGE	120,687	288,577	248,593	176,558	192,921	1,027,336
<u>OVERHEAD (50%)</u>	60,343	144,289	124,297	88,279	96,460	513,668
<u>TOTAL LABOR + OVERHEAD</u>	181,030	432,866	372,890	264,837	289,381	1,541,004
<u>DIRECT COSTS</u>						
Advisory Committee						
honorarium (\$150/day)	0	15,600	4,800	0	0	20,400
per diem (\$50/day)	0	5,200	1,440	0	0	6,640
ground transportation (\$20/day)	0	2,080	640	0	0	2,720
travel (\$200/trip)	0	9,000	3,200	0	0	12,200
Consultants	0	0	0	0	4,500	4,500
Travel	3,360	3,360	3,360	3,360	3,360	16,800
Data Contract - IMS (75% of total contract)	0	195,279	195,279	195,279	216,149	801,986
Eval. of IMS Data (75% of total contract)	0	0	0	96,787	96,787	193,574
TOTAL DIRECT COSTS	3,360	230,519	208,719	295,426	320,796	1,058,820
<u>TOTAL LABOR & DIRECT COSTS</u>	184,390	663,385	581,609	560,263	610,177	2,599,824
G & A @ 15%	27,659	99,508	87,241	84,039	91,527	389,974
<u>TOTAL COSTS</u>	216,049	762,893	668,850	644,302	701,704	2,989,798

program costs appear to be stabilizing at about \$700,000 per year, and this amount might be considered the program's annual operating cost. We judge that roughly half of this expense is MAC-related and that the other half is EAC-related. The assumptions used to derive these estimates are discussed below.

The current and the former directors of the MAC program provided much of the information used to calculate program costs.¹ They completed a labor matrix indicating all individuals from the government who have worked on the MAC program since its inception and, for each year since 1975, gave subjective estimates for the percentage of time each person spent on the program. The GS levels were also obtained. Additional information on the time spent on the program by FDA personnel was provided by the MAC liaison person at the FDA. In two instances, the FDA liaison person and MAC program staff gave independent time estimates for the same people. As a matter of convention, we simply adopted the higher estimate. Salary costs were calculated using the federal salary schedule for each year and the GS levels indicated by the respondents.²

Fringe benefit rates were obtained from the Cost Comparison Handbook, published in March 1979 by the Office of Management and Budget. The benefit rates for the retirement fund (20.4%), life and health insurance (3.7%), and workmen's compensation and unemployment programs (1.9%) were applied to the labor costs in each year. We somewhat arbitrarily estimated the overhead rate for the federal government at 50 percent of direct labor

¹There was no program budget.

²Salaries were taken at step five.

plus fringe benefits. The following kinds of expense are considered as being included in the overhead rate:

- 1) an imputation for rent,
- 2) maintenance,
- 3) telephone,
- 4) computer,
- 5) xerox and printing,
- 6) postage and delivery,
- 7) supplies,
- 8) furnishings, and
- 9) miscellaneous services (e.g., stenographic).

Of course, it would have been preferable to have more straightforward estimates for each of these costs.

Information on direct charges to the program were also obtained from the current and former MAC program directors. Costs incurred by the Advisory Committee in 1976 and 1977 were calculated from the number of meetings attended by each Advisory Committee member, using the following assumptions: each member received \$150 per day honorarium, \$50 per day for expenses, and \$20 per day for ground transportation; the first meeting was three days long and the rest were two days long; and travel cost averaged \$200 per trip. The cost for consultants in 1979 was obtained directly from the MAC program director. Travel cost estimates were developed based on the assumption that MAC staff had taken 15 two-person trips. Other assumptions were as follows: \$50 per day for expenses and \$20 per day ground transportation per person; average trip duration of three days; and average travel cost of \$350. Finally, 75 percent of the total worth of the IMS data contract and 75 percent of the cost of the contract to evaluate the IMS data were attributed to the MAC-EAC program. The date-related costs are primarily attributable to the EAC-part of the program, and account for about one-half of the total program cost in 1979. Other program costs are primarily attributable to the MAC-part of the program.

The general and administrative (G&A) expense rate is somewhat arbitrarily taken as being 15 percent; it is applied to the labor and direct cost total (labor, fringe benefits, overhead, and direct charges), to obtain the total MAC program cost.¹ This G&A rate is considered to reflect the following types of expense:

- 1) supervisory,
- 2) personnel department,
- 3) payroll,
- 4) legal,
- 5) public relations, and
- 6) program evaluation.

5.6.2 Incremental State Costs

This section presents estimates--developed in consultation with the state pharmacist consultants--for the incremental costs incurred by each of the five study states in initially implementing and then continuing to operate the federal MAC-EAC program. As seen in Table 5-22, these costs have generally been quite modest.²

Arkansas

The largest part of program implementation expense in Arkansas was incurred in response to the mandate for a dispensing fee survey. In fact, two such cost studies were conducted subsequent to the effective date of the MAC-EAC regulations. The first was conducted in May 1977 by the American College of Apothecaries and cost \$17,000, while the second was conducted in May 1980 by a local CPA firm and cost \$30,000. The only other cost associated with state implementation, over and above the expense of normal

¹We had sought to obtain standard government rates for this purpose but were unsuccessful.

²Overhead and general and administrative expense rates were not applied to the state cost estimates and thus the estimates developed are somewhat understated.

Table 5-22
SUMMARY OF STATE COSTS ASSOCIATED WITH FEDERAL MAC-EAC PROGRAM

Type of Cost	STATE					Average
	Arkansas	Minnesota	Tennessee	Massachusetts	Maine	
Implementation Costs						
Bulletins	\$ 952	\$ 600	—	—	—	\$ 2,100
Fee Surveys	\$47,000	\$11,891	\$22,000	—	—	\$ 9,500
Other				\$15,000		
TOTAL IMPLEMENTATION COSTS	\$47,952	\$12,491	\$22,000	\$15,000	\$11,600	\$21,809
Operational Costs, Dec '77 - Dec. '79						
Bulletins	\$ 1,368	\$ 8,135	—	—	—	—
Programming		\$ 5,200	—	—	—	—
ESTIMATED ANNUAL OPERATIONAL COSTS	\$ 700	\$ 9,268	—	—	—	\$ 1,994

program operations, was the cost mailing MAC-related notices to physicians and pharmacists. The estiamted cost was \$952.00.

The only significant operating expense being incurred by the state arises from periodic notification of pharmacists about MAC price changes. Postage for nine such mailing during the study period amounted to \$1,368. The materials were prepared by existing personnel, and thus did not entail any incremental cost to the state. MAC-related reprogramming was also done on this basis.

Maine

Although the state indicates that it might otherwise have conducted a dispensing fee survey, the \$9,500 spent on the mandated survey is nevertheless be attributed to the MAC program. The state mailed seven bulletins that dealt exclusively with MAC implementation issues, costing in total about \$2,100. While MAC issues were also addressed in other program bulletins, these bulletins would have been sent anyway. No reprogramming expense was incurred.

The costs of operating the MAC/EAC program are minimal. Although a small amount of time is spent in updating the claims processing system to reflect MAC price changes and in manual processing of "medically necessary" overrides, both the state and the fiscal agent indicated that no additional personnel were needed to perform these tasks.

Massachusetts

In support of EAC development, the Massachusetts Rate Setting Commission spent approximately \$15,000 in labor to conduct a 3-4 month investigation of acquisition and dispensing patterns in the state. This research expense was apparently the only incremental cost incurred by the

state in implementing the MAC-EAC program.¹ Whereas development of the EAC also involved some meetings and consultation among state Medicaid personnel, such personnel inputs entailed no incremental cost to the state. The state's Director of Pharmacy Reimbursement spent the largest amount of time on MAC-EAC implementation, perhaps 2-3 months in total. Inasmuch as no additional personnel were required to assist the pharmacy consultant with his other responsibilities, these implementation-related activities involved no incremental cost to the state. The mandated dispensing fee survey was conducted by the Massachusetts College of Pharmacy at no cost to the state. The fiscal intermediary also incurred no substantial cost; no reprogramming was involved, and physician-certified "over-rides" were easily accommodated within the pre-existing manual processing mode.

The incremental operating costs to the state program are virtually insignificant. Fewer than 1,000 "brand necessary" overrides are being processed per year, and we estimate that the incremental cost of processing these overrides amounts to less than \$100 per year. Some very nominal expense is also incurred in updating the claims processing system to reflect MAC price changes. However, the frequency of price changes is said to be no greater than it would have been without the MAC program.

Minnesota

The state spent a total of \$11,485 in conducting the mandated pharmacy dispensing fee survey. Two special bulletins were also sent to participating pharmacies. The estimated cost was \$600.

¹The Massachusetts Director of Pharmacy Reimbursement noted that providers were the ones incurring substantial implementation expense. In particular, he indicated that much pharmacist time was consumed in physician "call-backs" to explain that the prescribed brand would not be dispensed without "brand necessary" certification. He also cited the expense and confusion involved in converting nursing home prescriptions to generic lines.

The incremental operating costs in Minnesota are considerably higher than in the other study states. In January 1979, it was decided that existing staff could not adequately maintain the volume of MAC price updates to the claims processing system, and a pharmacy student was hired part-time to handle them, at an annual cost of \$5,200.¹ Six MAC-related bulletins were also mailed during the two-year interval, at a cost of \$8,135. Thus, the annual operating expense of the program is approximately \$9268 (\$8135/2 + \$5200).

Tennessee

The federally-mandated dispensing fee survey was conducted in 1978 by a professor at the University of Tennessee School of Pharmacy. It cost \$22,000. The only other operating expense that might be attributed to the Tennessee MAC program is the \$140,000 annual contract with the University of Tennessee's School of Pharmacy to perform bioavailability tests. However, this contract was actually mandated by the state legislature at the time it passed its drug substitution bill, prior to the advent of the state MAC program. Consequently, it is doubtful that its cost should be attributed to the state program. In any event, the expense is not one that can be attributed to the federally mandated MAC program.

5.7 Other Program Effects

Section 3.0 hypothesized the existence of various program effects in addition to that of the cost savings objective. Among other program effects hypothesized were ones related to:

- pharmacy participation,

¹ The state uses the ten-digit NDC code which distinguishes product, dosage, and package size--nearly 60,000 product codes.

- pharmacy dispensing patterns and losses,
- dispensing fee levels,
- physician prescribing behavior, and
- drug manufacturers' pricing behavior.

This section investigates each of these to the extent or depth permitted by the date collected in this study.

5.7.1 Pharmacy Participation

We could find no evidence that pharmacy participation rates have declined due to MAC-EAC in the five study states. However, reliable information on pharmacy participation could only be obtained in two study states, Maine and Tennessee. The Maine Medicaid program furnished information on the number of unique pharmacy checks issued in each pay cycle. We regard the average number of checks issued per six-month interval as an operational measure of pharmacy participation. The figures in Table 5-23 show that number of participating pharmacies has actually increased since the advent of the MAC-EAC program.

Table 5-23

PHARMACY PARTICIPATION IN MAINE

<u>Period</u>	Average Number of Checks Written
4/75 - 9/75	219
10/75 - 3/76	220
4/76 - 9/76	222
10/76 - 3/77	229
4/77 - 9/77	233
10/77 - 3/78	246
4/78 - 9/78	259
10/78 - 3/79	261
4/79 - 9/79	263

The numbers of Tennessee pharmacies receiving Medicaid payment in any given month are given in Table 5-24 for April 1977 through December 1979. The data suggest that the level of pharmacy participation in Tennessee has remained stable throughout the 1977-1979 interval. That is, there is no evidence of any program effect on pharmacy participation rates. However, data were not available for earlier time periods. Consequently, the data reported do not preclude the possibility that there might have been an earlier impact.

5.7.2 Pharmacy Dispensing Patterns and Losses

The substantial impact of the MAC program on pharmacy dispensing patterns is most evident for chlordiazepoxide and propoxyphene HCl, the two MAC product markets formerly dominated by more expensive brand-name entities. Table 5-25 shows the time trends in percentage market share for Librium (chlordiazepoxide) and Darvon (propoxyphene) in each of the five study states except Tennessee.¹ In all four states an abrupt reduction in market share for these products occurred near the date of MAC implementation.²

Nevertheless, it is significant that these higher-priced brand name products continued to be dispensed at all. It suggests that pharmacists were at least temporarily taking a loss on ingredient costs due to the MAC program. To estimate this loss, the per-unit ingredient cost reimbursement for the most recent period prior to MAC implementation was taken as an estimate of each product's acquisition cost. The difference between this amount and

¹Because Tennessee uses a generic drug code, it was not possible to distinguish the product actually dispensed.

²See Table 5-1 for the implementation dates.

Table 5-24
PHARMACY PARTICIPATION IN TENNESSEE

Month	Number of Pharmacies Participating	Month	Number of Pharmacies Participating
April 1977	1086	Aug. 1978	984
May 1977	1147	Sept. 1978	1015
June 1977	1168	Oct. 1978	1025
July 1977	1154	Nov. 1978	999
Aug. 1977	1152	Dec. 1978	1019
Sept. 1977	1137	Jan. 1979	1008
Oct. 1977	1080	Feb. 1979	1020
Nov. 1977	1163	March 1979	1036
Dec. 1977	1007	April 1979	1017
Jan. 1978	1109	May 1979	997
Feb. 1978	1137	June 1979	1034
March 1978	1131	July 1979	1015
April 1978	1138	Aug. 1979	1023
May 1978	1069	Sept. 1979	1017
June 1978	1023	Oct. 1979	1031
July 1978	997	Nov. 1979	1025
		Dec. 1979	1015

Source: Tennessee MMIS

Table 5-25

PER-UNIT MARKET SHARES, LIBRIUM AND DARVON

State/Period	LIBRIUM			DARVON		
	5 Mg.	10 Mg.	25 Mg.	65 Mg.	65 Mg.	Compound
MINNESOTA						
4/75 - 9/75	100.0%	99.9%	100.0%	81.4%	94.4%	
10/75 - 3/76	100.0	99.9	100.0	89.5	94.9	
4/76 - 9/76	100.0	100.0	99.8	91.7	95.1	
10/76 - 3/77	98.6	98.9	99.5	90.6	95.2	
4/77 - 9/77	93.9	97.5	98.1	90.2	94.6	
10/77 - 3/78	85.8	96.7	99.2	90.1	93.6	
4/78 - 9/78	77.6	92.4	92.5	65.3	64.8	
10/78 - 3/79	44.4	60.2	64.1	45.3	40.6	
4/79 - 9/79	32.8	45.3	50.1	35.6	33.4	
MASSACHUSETTS						
4/74 - 9/74	100.0%	100.0%	100.0%	94.8%	96.3%	
10/75 - 3/75	100.0	100.0	100.0	93.2	95.4	
4/75 - 9/75	99.9	99.9	99.9	89.2	91.7	
10/75 - 3/76	99.8	99.7	98.9	86.6	90.0	
4/76 - 9/76	99.3	99.2	98.4	85.3	89.5	
10/76 - 3/77	97.2	97.0	96.5	83.1	87.2	
4/77 - 9/77	93.6	92.9	92.5	82.1	85.8	
10/77 - 3/78	88.8	89.3	91.2	79.4	85.0	
4/78 - 9/78	70.6	71.3	71.8	62.3	67.8	
10/78 - 3/79	27.3	26.5	24.6	20.7	23.8	
MAINE						
4/75 - 9/75	100.0%	100.0%	100.0%	92.1%	93.5%	
10/75 - 3/76	100.0	100.0	100.0	92.0	92.7	
4/76 - 9/76	99.9	99.8	99.7	88.1	91.5	
10/76 - 3/77	99.1	99.3	98.6	87.8	91.4	
4/77 - 9/77	98.1	96.2	96.1	80.1	90.1	
10/77 - 3/78	95.2	92.3	94.1	77.8	90.3	
4/78 - 9/78 ¹	58.7	59.3	57.9	8.2	31.4	
10/78 - 3/79 ¹	14.8	14.4	20.0	3.3	13.9	
4/79 - 9/79	19.3	17.1	18.8	7.1	23.5	
ARKANSAS						
1/75 - 6/75	100.0%	100.0%	100.0%	79.6%	93.4%	
7/75 - 12/76	100.0	100.0	100.0	78.6	92.7	
1/76 - 6/76	100.0	100.0	100.0	47.7	59.1	
7/76 - 12/77	100.0	100.0	100.0	21.3	22.4	
1/77 - 6/77	100.0	98.3	100.0	22.6	21.4	
7/77 - 12/78	100.0	96.0	100.0	17.5	23.7	
1/78 - 6/78	NA	NA	NA	15.9	27.2	
7/78 - 12/79	NA	NA	NA	16.8	21.8	
1/79 - 6/79	21.5	32.8	25.2	16.0	16.0	

NOTE: NA--not available.

¹ Post-MAC usage understated due to temporary use of special MAC codes for brand-name products.

the actual ingredient cost reimbursement in subsequent periods was multiplied by the number of units dispensed to obtain an estimate of the pharmacy losses.¹ The results are shown in Table 5-26. As can be seen, the extent to which MAC savings is made up of pharmacy losses varies considerably from state to state. If the financial burden imposed on pharmacies were to continue indefinitely at the sizeable level shown in Massachusetts, it would be a serious problem for the MAC program. However, it seems more likely that Librium and Darvon market shares will continue their abrupt decline; certainly there is no evidence to date that equilibrium has been achieved.

5.7.3 Dispensing Fee Levels

The MAC-EAC regulations require all states to conduct periodic surveys of pharmacy operating costs and establish reasonable cost-related fees. It was thought that dispensing fee levels might be increased. This section presents the dispensing fee histories for each of the five sample states. Program officials were altogether unwilling to attribute any portion of the post-MAC fee increases to the program itself. However, we elsewhere conclude (see Section 1.0) on the basis of correlational evidence that about one-half of the post-MAC fee increases should be attributed to the program.

Arkansas

From 1974 through December 1976, the dispensing fee in Arkansas was \$2.00. In January 1977, the fee was raised to \$2.50. The mandated fee

¹These figures overstate pharmacy losses and the extent that each state's ingredient cost reimbursement level in the "before" period exceeded actual acquisition costs. Furthermore, these calculations assume that "brand necessary" overrides were not a significant factor. Inasmuch as this could not be shown for Minnesota (see Section 5.7.4), pharmacy loss estimates are not given for that state.

Table 5-26

ESTIMATED PHARMACY LOSSES ON LIBRIUM AND DARVON

<u>State</u>	<u>Time Period</u>	<u>Estimated Pharmacy Loss</u>	<u>Percent of Total MAC Savings on Propoxyphene and Chlordiazepoxide</u>
Arkansas	1/79 - 6/79	\$5,093	14.7%
Maine	4/79 - 9/79	\$2,832	11.8%
Massachusetts	4/78 - 9/78	\$51,497	63.4%
	10/78 - 3/79	\$34,151	27.6%

NA--not available.

¹Based on per-unit estimates.

survey was conducted in May 1977 by the American College of Apothecaries and led to the fee being increased to \$2.70 in July 1977. The fee was increased to \$2.87 in March 1978 and then again to \$3.07 on July 1, 1979. A second fee survey, performed by a local CPA firm in May 1980, led to the fee being increased to \$3.19 on July 1, 1980..

Maine

From 1974 until January 1979, the dispensing fee in Maine had been \$2.00. The mandated dispensing fee was conducted in 1976 and indicated that the fee should be \$2.50. However, budgetary constraints delayed adjustment of the fee until January 1979, at which time it was raised to \$2.70.

Massachusetts

The dispensing fee in Massachusetts was \$1.85 in 1974 and rose to \$1.93 and then to \$2.10 in 1975. The fee remained at this level for over three years, until the time of EAC implementation. The Medicaid dispensing fee in Massachusetts is established by the Massachusetts Rate Setting Commission, and the Commission authorized the Massachusetts College of Pharmacy to conduct the mandated dispensing cost survey. The mean dispensing cost in 1975 was found to be \$2.32. After adjusting this figure to include inflation and profit, the report recommended a dispensing fee of \$2.85. Although the report was released in September 1977, the fee was not adjusted until "new" EAC price limits were imposed in October 1978. The state's original intent had been to raise the dispensing fee to \$2.60, but after hearings were held and testimony received from the Massachusetts State Pharmaceutical Association, the fee was eventually set at \$2.70. Inasmuch as the fee recommendation was increased from \$2.60 to \$2.70 after hearing arguments concerning the pharmacy revenue losses expected to result from the EAC program, this \$0.10 fee difference can probably be attributed to the EAC program.

Minnesota

Despite a federal prohibition, the Minnesota Medicaid program continues to use a mark-up type fee, one that varies with the cost of ingredients. The formula for such fee level determination has remained unchanged in the post-MAC era. The use of a markup fee implies that MAC reimbursement savings in Minnesota were also accompanied by savings in dispensing fee reimbursement. The estimated fee-related savings for each study period are indicated below:

<u>Period</u>	<u>Estimated Fee Savings</u>
6	\$ 5,438
7	18,515
8	23,526
9	22,025
Total	<u>\$69,504</u>

Of course, such savings are merely a short-run phenomenon. Once the state adopts a fixed dispensing fee, reductions in ingredient cost reimbursement will no longer affect the fee.

Tennessee

The federally mandated dispensing fee survey was conducted in 1978 by a professor at the University of Tennessee School of Pharmacy. The study recommended setting the fee at the 75th percentile of the pharmacy cost distribution, equal to \$3.00 per prescription. On July 10, 1978 the State raised the fee from \$2.30 to \$2.60 (the 50th percentile).

5.7.4 Prescribing Behavior

One of the study hypotheses put forward in Chapter 3 was that prescribing practices would be changed in response to the MAC program. In

particular, it was thought that manufacturers might begin promoting sole-source products relatively more heavily, attempting to shift physician prescribing toward sole-source, therapeutically equivalent substitutes for the MAC products. We investigated this prospect in four of the five study states--Maine, Minnesota, Massachusetts, and Tennessee.¹ Changes over time in the MAC and non-MAC therapeutic market shares were examined in each of these states. For example, the chlordiazepoxide product share of the ataractic tranquilizer market in Minnesota is shown by time period in Table 5-27.² In general, we found that the ampicillin and penicillin VK therapeutic market shares were stable, but that chlordiazepoxide, propoxyphene and tetracycline shares of their respective therapeutic markets were declining over time. It thus appears that non-MAC products are being substituted for at least some of the MAC products, and therefore that we may expect MAC-related reimbursement savings to decline over time. Nevertheless, we found no clear evidence that such prescribing shifts were in fact precipitated by the MAC program. For example, we see from Table 5-27 that the chlordiazepoxide share of the ataractic tranquilizer market in Minnesota declined from 10.1 to 5.8 percent over the study interval; however, there is no indication that the rate of substitution changed with imposition of the MAC reimbursement limit early in the seventh study period. Although propoxyphene's share of the non-narcotic analgesic market has fallen more sharply in several study states since imposition of the MAC (e.g., see Table 5-28 for Maine), we doubt that the MAC limit was responsible. More likely it was a reaction to mounting concerns about the safety and efficacy of propoxyphene itself. As

¹The Arkansas data did not permit such analyses. Furthermore, findings from the Minnesota analyses were somewhat uneven because of data problems.

²Other such tables have been provided to HCFA.

Table 5-27

ATARACTIC TRANQUILIZERS, MINNESOTA
 April 1975 - September 1979

Time Period/ Product	Prescriptions		Time Period/ Product	Prescriptions	
	Number	Percent		Number	Percent
<u>Period 1:</u>					
Chlordiazepoxide HCl	7,880	10.1	Chlordiazepoxide HCl	6,784	7.1
Diazepam TAB/CAP	34,442	44.2	Diazepam TAB/CAP	31,968	33.3
Thioridazine TAB/CAP	20,936	26.9	Thioridazine TAB/CAP	24,852	25.9
All Others	14,642	18.8	All Others	32,470	33.8
Totals	77,900	100.0	Totals	96,074	100.0
<u>Period 2:</u>					
Chlordiazepoxide HCl	8,024	9.2	Chlordiazepoxide HCl	6,034	6.4
Diazepam TAB/CAP	35,685	41.1	Diazepam TAB/CAP	30,228	32.2
Thioridazine TAB/CAP	23,932	27.6	Thioridazine TAB/CAP	24,618	26.2
All Others	19,134	22.1	All Others	32,928	35.1
Totals	86,775	100.0	Totals	93,808	100.0
<u>Period 3:</u>					
Chlordiazepoxide HCl	8,147	8.3	Chlordiazepoxide HCl	5,277	5.9
Diazepam TAB/CAP	37,198	37.7	Diazepam TAB/CAP	27,218	30.6
Thioridazine TAB/CAP	26,075	26.4	Thioridazine TAB/CAP	24,408	27.5
All Others	27,194	27.6	All Others	31,954	36.0
Totals	98,614	100.0	Totals	88,857	100.0
<u>Period 4:</u>					
Chlordiazepoxide HCl	7,209	7.7	Chlordiazepoxide HCl	5,276	5.8
Diazepam TAB/CAP	32,972	35.2	Diazepam TAB/CAP	26,603	29.3
Thioridazine TAB/CAP	24,532	26.2	Thioridazine TAB/CAP	25,209	27.7
All Others	28,893	30.9	All Others	33,813	37.2
Totals	93,606	100.0	Totals	90,901	100.0
<u>Period 5:</u>					
Chlordiazepoxide HCl	6,773	7.3			
Diazepam TAB/CAP	31,947	34.5			
Thioridazine TAB/CAP	24,152	26.1			
All Others	29,645	32.0			
Totals	92,517	100.0			

Table 5-28

NON-NARCOTIC ANALGESICS, MAINE
 April 1975 - September 1979

Time Period/ Product		Prescriptions		Time Period/ Product		Prescriptions	
		Number	Percent			Number	Percent
<u>Period 1:</u>							
MAC Propoxyphene	HCl and CMPD	9,416	47.1	MAC Propoxyphene	HCl and CMPD	7,739	34.8
Non-MAC Propoxyphene	HCl and CMPD	795	4.0	Non-MAC Propoxyphene	HCl and CMPD	956	4.3
Propoxyphene	Napsylate and CMPD	3,986	19.9	Propoxyphene	Napsylate and CMPD	6,897	31.0
Butalbital and APC		2,196	11.0	Butalbital and APC		2,217	10.0
Pentazocine		1,577	7.9	Pentazocine		2,267	10.2
All Other		2,030	10.2	All Other		2,173	9.8
Totals		20,000	100.0	Totals		22,249	100.0
<u>Period 2:</u>							
MAC Propoxyphene	HCl and CMPD	10,214	47.0	MAC Propoxyphene	HCl and CMPD	8,133	33.4
Non-MAC Propoxyphene	HCl and CMPD	921	4.2	Non-MAC Propoxyphene	HCl and CMPD	1,034	4.3
Propoxyphene	Napsylate and CMPD	4,763	21.9	Propoxyphene	Napsylate and CMPD	7,846	32.3
Butalbital and APC		2,190	10.1	Butalbital and APC		2,506	10.3
Pentazocine		1,758	8.1	Pentazocine		2,346	9.6
All Other		1,873	8.6	All Other		2,460	10.1
Totals		21,719	100.0	Totals		24,325	100.0
<u>Period 3:</u>							
MAC Propoxyphene	HCl and CMPD	9,109	44.6	MAC Propoxyphene	HCl and CMPD	6,270	27.9
Non-MAC Propoxyphene	HCl and CMPD	898	4.4	Non-MAC Propoxyphene	HCl and CMPD	1,030	4.6
Propoxyphene	Napsylate and CMPD	4,704	23.0	Propoxyphene	Napsylate and CMPD	8,000	35.6
Butalbital and APC		2,109	10.3	Butalbital and APC		2,344	10.4
Pentazocine		1,846	9.0	Pentazocine		2,093	9.3
All Other		1,744	8.5	All Other		2,704	12.0
Totals		20,410	100.0	Totals		22,441	100.0
<u>Period 4:</u>							
MAC Propoxyphene	HCl and CMPD	9,480	41.1	MAC Propoxyphene	HCl and CMPD	4,346	21.6
Non-MAC Propoxyphene	HCl and CMPD	984	4.3	Non-MAC Propoxyphene	HCl and CMPD	845	4.2
Propoxyphene	Napsylate and CMPD	6,136	26.6	Propoxyphene	Napsylate and CMPD	7,762	38.6
Butalbital and APC		2,396	10.4	Butalbital and APC		2,243	11.2
Pentazocine		2,066	9.0	Pentazocine		2,131	10.6
All Other		2,005	8.7	All Other		2,784	13.8
Totals		23,067	100.0	Totals		20,111	100.0
<u>Period 5:</u>							
MAC Propoxyphene	HCl and CMPD	8,915	38.0				
Non-MAC Propoxyphene	HCl and CMPD	1,033	4.4				
Propoxyphene	Napsylate and CMPD	6,885	29.3				
Butalbital and APC		2,264	9.6				
Pentazocine		2,268	9.7				
All Other		2,114	9.0				
Totals		23,479	100.0				

seen from Table 5-28, total non-narcotic analgesic prescription volume fell one-for-one as the number of MAC propoxyphene prescriptions declined from 8,133 in Period 7 to 4,346 in Period 9, suggesting that other products were not being substituted within the same therapeutic category. Furthermore, the prescription volume of propoxyphene napsylate, the most likely substitute, was unchanged over the same interval.

A central premise of the MAC program was that physicians would not generally certify "brand necessary" and thereby permit override of the MAC reimbursement limits. The overrides were not a significant factor in four of the five study state programs. The Maine program experiences fewer than one override per day. In Massachusetts, overrides amount to only 0.24 percent of MAC prescription volume, and in Arkansas, program staff indicate that only 1-2 overrides are processed per month. Furthermore, there have been no overrides in Tennessee. Minnesota, on the other hand, has no mechanism to monitor or identify overrides. However, judging by the level of per-unit reimbursement for Librium, the override volume is considerable and accounts for as much as 22 percent of prescriptions.

5.7.5 Pricing Behavior

The possibility of MAC-related effects on manufacturer price levels was suggested in Section 3.0. Although it is not one of the primary concerns of this study, some attention was nevertheless given to investigating the evidence for such prospects. In particular, the monthly IMS invoice level price data being purchased by HCFA are used to test three general hypotheses concerning potential MAC impacts on industry pricing behavior:

H_1 : Manufacturers of higher-priced brands of the MAC products tend to reduce their prices to the MAC level.

H_2 : Manufacturers of lower-priced brands tend to increase their prices to the MAC level.

H_3 : Manufacturers tend to increase the prices of sole-source substitutes for the MAC products.

The reader is forewarned that our tests of these hypotheses are scarcely definitive. As an analytic matter, it is not easy to reliably distinguish MAC-related effects on manufacturer pricing strategy, given the multitude of other factors impinging on the pharmaceutical marketplace (e.g., substitution and advertising). Furthermore, it might take some time for the industry to adjust its pricing policies, so that the ultimate, long-run effects might not yet be seen.

Since May 1977, HCFA has purchased monthly invoice price data, compiled by IMS America from a national sample of 800 pharmacies. Among information obtained are the prices paid by pharmacies for the most popular package size of 300 leading products, including the four leading dosage forms of each product and the ten leading brands for each dosage form. Both the mean and decile unit prices are given. Between May 1977 and June 1980, 38 such monthly price compilations were received by HCFA.¹ However, one of these reports could not be found, meaning that only 37 observations were potentially available. Furthermore, the list of manufacturers for each product varied somewhat over time--as the IMS sample either reflected or did not reflect sufficient volume to report, or as manufacturers entered or left the market. Thus, many fewer observations were available for some manufacturers' products than for others'.

For the 15 initial MAC product-dosage forms, a time series of mean per-unit invoice price levels was prepared for each manufacturer of each MAC

¹The monthly data are actually bimonthly averages.

product. This was likewise done for various dosage forms of two sole-source products thought to be substitutes for MAC products--propoxyphene napsylate (Darvon-N) and diazepam (Valium). Seeking a statistical relationship between MAC implementation and the invoice price levels, we estimated relationships of the following kinds for each time series of price data:

$$P_t = b_0 + b_1 * t + b_2 * t^2 + b_3 * MAC,$$

where P_t is the mean price for that product in time period t ,
 t is the time period (ranging from 1 to 38)

t^2 is simply the squared value of "t", and

MAC is a dummy (0-1) variable indicating whether or not the MAC was in effect at that time.

The time (t) and time-squared (t^2) terms were included to control--as well as we could--for general trends in manufacturer price levels. A total of 137 such relationships were estimated and the results are shown in Table 5-29. The MAC variable is significant at the .10 level or better in 46 of the 137 models, or 34 percent. The estimated MAC effect is negative in 29 (or 63 percent) of these cases. However, the results are somewhat more revealing when stratified according to whether the manufacturer's pre-MAC price level was above or below the MAC reimbursement limit. The pre-MAC price exceeded the MAC reimbursement limit in 24 of the 46 relationships having significant MAC coefficients, and 18 (or 75 percent) of these coefficients are negative. Among the 22 cases that had pre-MAC price levels below the MAC limit, only 11 (or 50 percent) are negative. These results are broadly consistent with the hypothesis that higher-priced manufacturers tend to lower their prices toward the MAC level. Furthermore, there is at least some support for the hypothesis that lower-priced manufacturers tend to increase prices. Nevertheless, it should also be apparent that the behavioral context is much more complex .

Table 5-29
MODELS OF THE MANUFACTURERS' PRICE RESPONSE

PRODUCT/ DOSAGE FORM	MANUFACTURER	COEFFICIENTS				R-SQUARE	F	N
		CONSTANT	TIME	TIMESQ	MAC			
Ampicillin, 250 Mg. Capsule	Parke-Davis	.0786	-.00193*	.0000149	.00733	.693	24.86	37
	Wyeth	.0773	-.00113	-.00000550	.00504	.634	18.48	36
	Ayerst	.0812	-.00382**	.0000619	.0403***	.507	7.53	26
	Upjohn	.0948	-.00267***	.0000402***	.00798	.808	39.25	32
	Squibb	.0830	-.00250***	.0000353**	.00620	.772	37.29	37
	Bristol	.162	.00169	-.000148*	.00945	.787	29.59	28
	Lederle	.0857	-.00422*	.000189	.00397	.573	4.48	14
	Pfipharmecs	.0647	.00167*	-.0000453**	-.0175**	.279	3.75	33
	Smith-Kline	.0702	-.00209***	.0000319***	.00744***	.904	103.60	37
	Purepac	.0621	-.000401	.0000147	.000132	.378	3.03	19
	Reid-Provident	.125	-.00161	.0000382	.00101	.226	1.07	15
	All Other	.0729	-.00269**	.0000442**	.00873	.746	23.54	28
Ampicillin, 500 Mg. Capsule	Parke-Davis	.134	.000736	-.0000348	-.0242**	.616	17.68	37
	Wyeth	.136	.00137*	-.0000334*	-.0202***	.302	4.62	36
	Squibb	.133	.000637	-.00000969	-.0162	.079	0.94	37
	Pfipharmecs	.111	.00191	-.0000583	-.0113	.057	0.57	33
	Bristol	.247	-.00276	-.00007	.00227	.439	8.62	37
	Lederle	.143	.00190	-.000240	-.0197	.820	10.64	11
	Smith-Kline	.146	-.00341***	.0000585***	-.000355	.944	185.91	37
	Upjohn	.123	.00287	-.00000971	-.0155***	.792	38.15	34
	Purepac	.120	-.000243	-.0000125*	-.00249	.577	12.26	31
	McKesson	.154	-.00402**	.0000760**	.0127	.747	5.90	10
	Reid-Provident	.202	-.00280	.000102	.0379	.255	0.80	11
	All Other	.127	-.00287***	.0000412***	.00754	.935	115.46	28
Ampicillin, 125 Mg. Liquid	Parke-Davis	.0119	-.0000859	.402 x 10 ⁻⁶	-.000176	.718	27.97	37
	Wyeth	.0108	-.0000631	.345 x 10 ⁻⁶	-.0000986	.523	11.69	36
	Pfipharmecs	.0103	.000246*	-.00000636**	-.000401	.277	3.69	33
	Ayerst	.0136	-.000128	.00000318**	.0000998	.294	4.16	34
	Upjohn	.0148	-.000170*	.00000321*	-.000426	.693	18.09	28
	Bristol	.0250	.000107	-.00000554**	-.0000210	.725	29.00	37
	Squibb	.0120	-.000137**	.00000254**	-.0000934	.615	17.55	37
	Smith-Kline	.0147	-.000166***	.00000253***	-.00184***	.979	504.19	37
	Beecham Lab	.0134	-.000442***	.00000958***	.00286**	.305	4.68	36
	Lederle	.0164	-.000893***	.0000220***	.00306***	.855	21.64	15
	Reid-Provident	.0197	-.000470	.0000117	.00192	.225	0.97	14
	All Other	.0105	.000179	-.00000287	-.00329**	.410	5.56	28

*Significant at the .10 level

**Significant at the .05 level

***Significant at the .01 level

Table 5-29 (con't)
MODELS OF THE MANUFACTURERS' PRICE RESPONSE

PRODUCT/ DOSAGE FORM	MANUFACTURER	COEFFICIENTS				R-SQUARE	F	N
		CONSTANT	TIME	TIMESQ	MAC			
Ampicillin, 250 Mg. Liquid	Parke-Davis	.0171	-.0000924 (.00013)	-.00000148 (.00000)	-.00000272 (.00114)	.712	26.37	36
	Wyeth	.0164	-.000211 (.00015)	.00000185 (.00000)	.000805 (.00124)	.578	14.14	35
	Pfipharmecs	.0152	.000379 (.00025)	.0000130** (.00001)	-.000543 (.00185)	.433	7.13	32
	Ayerst	.0202	-.000186 (.00016)	.00000307 (.00000)	.000649 (.00135)	.189	2.32	34
	Upjohn	.0220	-.000321* (.00018)	.00000423 (.00000)	.000896 (.00144)	.579	11.94	30
	Bristol	.0334	.000861*** (.00028)	-.0000259*** (.00001)	-.00420* (.00239)	.705	25.52	36
	Squibb	.0187	-.000329** (.00015)	.00000478 (.00000)	.000588 (.00126)	.612	16.82	36
	Smith-Kline	.0211	-.000233** (.00011)	.00000225 (.00000)	-.00233** (.00090)	.887	84.00	36
	Beecham Lab	.0207	-.000682** (.00025)	.0000119** (.00001)	.00434* (.00220)	.363	5.89	35
	Lederle	.0244	-.00173* (.00096)	.0000650 (.00005)	.00547 (.00416)	.271	1.24	14
	Mfg. not stated	.00782	.00159** (.00061)	-.0000799*** (.00003)	-.00126 (.00128)	.630	3.40	10
	Reid-Provident	.0347	-.00201** (.00073)	.0000619** (.00003)	.00707*** (.00221)	.618	3.78	11
	All Other	.0161	-.000103 (.00031)	.773 x 10 ⁻⁶ (.00001)	-.0000940 (.00346)	.290	3.13	27
Chlordiazepoxide, 5 Mg. Capsules	Roche (Librium)	.0485	.000366*** (.00013)	-.575 x 10 ⁻⁶ (.00000)	-.00154 (.00114)	.831	54.05	37
	S.K.F.	.0152	-.000613 (.00054)	.0000122 (.00001)	.00204 (.00214)	.133	0.77	19
	All Other	.0208	-.000645*** (.00019)	.0000141*** (.00000)	-.00143 (.00156)	.692	17.22	27
	Roche (Librium)	.0669	.000526*** (.00010)	-.00000293 (.00000)	.0000915 (.00086)	.948	198.87	37
Chlordiazepoxide, 10 Mg. Capsules	S.K.F.	.0432	-.00175*** (.00021)	.0000289*** (.00000)	.00391** (.00169)	.877	76.18	36
	Parke-Davis	.0235	-.000633*** (.00010)	.0000123*** (.00000)	.00226** (.00086)	.698	19.23	29
	Roche (Libritabs)	.0738	.000545*** (.00011)	-.00000304 (.00000)	.000180 (.00100)	.936	161.14	37
	Lederle	.0157	.000489** (.00020)	-.0000105** (.00000)	-.00110 (.00135)	.283	3.42	30
	Generix	.0125	-.0000340 (.00027)	-.131 x 10 ⁻⁶ (.00001)	.000146 (.00135)	.067	0.65	31
	Purepac	.0269	-.00117*** (.00019)	.0000175*** (.00000)	.00332*** (.00094)	.881	51.94	25
	Rachelle	.0117	.0000814 (.00045)	-.437 x 10 ⁻⁶ (.00001)	-.000299 (.00206)	.185	0.83	15
	All Other	.0203	-.000448*** (.00008)	.00000756*** (.00000)	.000541 (.00078)	.867	58.76	31
Chlordiazepoxide, 25 Mg. Capsules	Roche (Librium)	.108	.00123*** (.00040)	-.00000122 (.00001)	.00440 (.00354)	.923	123.80	35
	S.K.F.	.0681	-.00248*** (.00021)	.0000444*** (.00000)	.00621*** (.00189)	.901	100.02	37
	Generix	.0171	.000531 (.00074)	-.0000120 (.00001)	.000481 (.00427)	.205	1.46	21
	All Other	.0291	-.0000737 (.00028)	.00000450 (.00001)	-.00347 (.00264)	.221	2.46	30
Diazepam, 2 Mg. Tablets	Roche (Valium)	.0652	-.000113 (.00008)	.00000346** (.00000)	.000318 (.00073)	.242	3.51	37
Diazepam, 5 Mg. Tablets	Roche (Valium)	.0825	.000456* (.00023)	-.679 x 10 ⁻⁶ (.00000)	.00604*** (.00210)	.888	86.81	37
Diazepam, 10 Mg. Tablets	Roche (Valium)	.120	.00113** (.00050)	-.00000461 (.00001)	.0146*** (.00446)	.902	100.78	37

*Significant at the .10 level

**Significant at the .05 level

***Significant at the .01 level

Table 5-29 (con't)

MODELS OF THE MANUFACTURERS PRICE RESPONSE

PRODUCT/ DOSAGE FORM	MANUFACTURER	COEFFICIENTS				R-SQUARE	F	N
		CONSTANT	TIME	TIMESQ	MAC			
Penicillin VK, 250 Mg. Tablets	Lederle	.0678	-.000226 (.00067)	-.00000918 (.00001)	-.0107* (.00570)	.353	6.00	37
	Parke-Davis	.0378	-.000292 (.00156)	-.0000322 (.00007)	.00209 (.00552)	.515	2.83	12
	Wyeth	.0777	.000300 (.00054)	-.00000643 (.00001)	-.0129** (.00462)	.466	9.61	37
	Robins	.0652	-.000498** (.00018)	-.0000104** (.00000)	.00226 (.00153)	.263	3.93	37
	Upjohn	.0449	.00142 (.00136)	-.0000225 (.00003)	-.0231** (.00935)	.355	3.67	24
	Lilly	.0912	-.00167 (.00144)	.0000373 (.00003)	.00150 (.0123)	.118	1.47	37
	Squibb	.0758	-.00631*** (.00188)	.0000925** (.00004)	.0647*** (.0161)	.559	13.52	36
	Pfipharmecs	.0374	-.000518* (.00025)	.0000119** (.00001)	.000358 (.00213)	.301	4.74	37
	Ross	.0928	.0000244 (.00036)	-.00000132 (.00001)	.000385 (.00176)	.022	0.12	20
	Smith-Kline	.0533	-.00118*** (.00033)	.0000211*** (.00001)	.00190 (.00281)	.688	24.29	37
	Bristol	.0950	-.00345 (.00227)	.0000737 (.00005)	.0196 (.0164)	.091	0.77	27
	All Other	.0392	.000130 (.00063)	-.00000158 (.00001)	-.00707 (.00538)	.143	1.84	37
Penicillin VK, 500 Mg. Tabs	Lederle	.0955	.00213 (.00179)	-.0000521 (.00004)	-.0527*** (.0153)	.568	14.03	36
	Parke-Davis	.0654	-.000460 (.00075)	-.0000181 (.00003)	-.00168 (.00342)	.845	25.47	18
	Wyeth	.122	.00152** (.00070)	-.0000318** (.00001)	-.0116* (.00601)	.126	1.59	37
	Robins	.125	-.000642*** (.00020)	.0000141*** (.00000)	.00111 (.00172)	.465	9.27	36
	Upjohn	.0670	-.000320 (.000230)	.00000470 (.00000)	.00156 (.00193)	.292	4.13	34
	Lilly	.167	-.000842 (.00184)	.269 x 10^-6 (.00004)	.00421 (.0155)	.243	3.42	36
	Squibb	.0973	-.00443*** (.00106)	.0000842*** (.00002)	.00999 (.00903)	.680	22.64	36
	Pfipharmeca	.0677	.00151 (.00117)	-.0000205 (.00002)	-.0174* (.0100)	.192	2.53	36
	Smith-Kline	.105	-.000868*** (.00029)	.0000137** (.00001)	-.0270*** (.00244)	.973	382.37	36
	All Other	.0583	.00172*** (.00053)	-.0000411*** (.00001)	-.0155*** (.00455)	.466	9.30	36
Penicillin VK, 125 Mg. Liquid	Ross	.0143	-.0000912 (.00037)	.00000425 (.00001)	-.00417* (.00225)	.424	3.92	20
	Lederle	.0118	-.000119** (.00005)	.00000298*** (.00000)	-.000440 (.00041)	.574	14.35	36
	Wyeth	.0130	-.00253*** (.00005)	.00000415*** (.00000)	.000596 (.00045)	.829	51.64	36
	Upjohn	.0138	-.000142 (.00018)	.00000312 (.00000)	-.00000271 (.00106)	.280	2.20	21
	Lilly	.0152	-.000181*** (.00003)	.00000329*** (.00000)	.000476* (.00028)	.810	45.33	36
	Squibb	.00998	-.0000627 (.00007)	.102 x 10^-6 (.00000)	.000169 (.00054)	.632	16.58	33
	Smith-Kline	.0131	-.000197** (.00008)	.00000443** (.00000)	-.00168** (.00070)	.753	31.55	35
	Pfipharmeca	.0113	-.0000185 (.00007)	.00000181 (.00000)	-.000869 (.00062)	.459	9.05	36
	Robins	.0113	.0000604 (.00007)	-.00000246* (.00000)	.000139 (.00058)	.424	7.86	36
	Parke-Davis	.00930	-.000145*** (.00004)	.00000296** (.00000)	.000687*** (.00024)	.687	10.96	19
	All Other	.0128	.0000632 (.00012)	-.00000219 (.00000)	-.00292** (.00119)	.621	14.77	31
Penicillin, 250 Mg. Liquid	Ross	.0232	-.000580 (.00070)	.0000180 (.00002)	-.00190 (.00365)	.421	3.87	20
	Lederle	.0164	-.000169 (.00023)	.00000277 (.00000)	-.00271 (.00193)	.461	9.42	37
	Wyeth	.0188	-.000524*** (.00017)	.00000834** (.00000)	.000538 (.00147)	.722	27.72	36
	Upjohn	.0174	-.000347** (.00014)	.00000671** (.00000)	.000437 (.00115)	.505	9.53	32
	Lilly	.0234	-.000565*** (.00018)	.00000968** (.00000)	.000150 (.00156)	.702	25.92	37
	Squibb	.0148	-.000359* (.00018)	.00000523 (.00000)	.000485 (.00144)	.512	10.15	33
	Parke-Davis	.0148	-.000392 (.00039)	.00000879 (.00001)	-.000636 (.00182)	.612	7.89	19
	Pfipharmeca	.0137	-.000143 (.00011)	.00000181 (.00000)	-.000624 (.00098)	.551	13.47	37
	Smith-Kline	.0169	-.000219 (.00015)	.00000322 (.00000)	-.00287** (.00132)	.728	29.44	37
	Robins	.0157	-.000146 (.00013)	.00000103 (.00000)	.00120 (.00108)	.432	8.35	37
	All Other	.0215	-.000654** (.00030)	.0000102 (.00001)	-.000860 (.00256)	.664	20.45	35

*Significant at the .10 level

**Significant at the .05 level

***Significant at the .01 level

Table 5-29 (con't)
MODELS OF THE MANUFACTURERS PRICE RESPONSE

PRODUCT/ DOSAGE FORM	MANUFACTURER	COEFFICIENTS				R-SQUARE	F	N
		CONSTANT	TIME	TIMESQ	MAC			
Propoxyphene, 65 Mg. Compound	Lilly (Darvon)	.0685	.000452*** (.00008)	-.00000655*** (.00000)	.0000608 (.00070)	.905	101.14	36
	Lederle (Dolene)	.0303	.000247* (.00012)	-.00000593** (.00000)	-.00314*** (.00107)	.573	12.50	32
	S.K.F.	.0336	-.000584*** (.00007)	.0000116*** (.00000)	.000762 (.00056)	.880	78.39	36
	All Other	.0175	.00152*** (.00046)	-.0000262*** (.00001)	-.0147*** (.00518)	.486	6.94	26
Propoxyphene, 65 Mg. Capsules	Lilly (Darvon)	.0682	.000473*** (.00011)	-.00000588** (.00000)	-.000503 (.00091)	.872	72.77	36
	Lederle (Dolene)	.0402	-.000276 (.00046)	.00000572 (.00001)	-.00516 (.00359)	.392	6.66	35
	S.K.F.	.0347	-.000582*** (.00019)	.0000113*** (.00000)	.000624 (.00160)	.505	10.90	36
	Lederle (Propoxyphene)	.0214	-.000180 (.00072)	.0000175 (.00003)	-.00319 (.00498)	.079	0.32	15
	All Other	.0221	.000581 (.00042)	-.00000912 (.00001)	-.00875** (.00380)	.218	2.42	30
Propoxyphene Napsylate 100 Mg. Suspension	Lilly (Darvon)	.0774	.000991*** (.00028)	-.0000136* (.00001)	.000566 (.00222)	.861	47.33	27
Propoxyphene Napsylate 100 Mg. Compound	Lilly (Darvon)	.0809	.000526* (.00029)	.00000590 (.00001)	.000747 (.00258)	.918	115.48	35
Propoxyphene Napsylate 50 Mg. Suspension	Lilly (Darvon)	.0263	-.00164*** (.00022)	.0000376*** (.00001)	.00419** (.00171)	.804	31.49	27
Propoxyphene Napsylate 50 Mg. Compound	Lilly (Darvon)	.0459	.000424*** (.00011)	.00000104 (.00000)	-.00155 (.00099)	.955	217.22	35
Tetracycline, 250 Mg. Capsules/ Tablets	Lederle	.0364	.0000378 (.00066)	.00000577 (.00001)	-.0122** (.00579)	.303	4.63	36
	Upjohn	.0258	.0000133 (.00048)	.00000625 (.00001)	-.00972** (.00425)	.328	5.21	36
	Robins	.0297	.0000585 (.00040)	.00000379 (.00001)	-.00719* (.00349)	.263	3.81	36
	S.K.F.	.0266	-.000578*** (.00020)	.0000145*** (.00000)	-.00199 (.00176)	.606	15.89	35
	Squibb	.0350	-.000312 (.00071)	.0000122 (.00001)	-.00830 (.00625)	.223	3.06	36
	Pfipharmecs	.0287	.000306 (.00069)	.00000199 (.00001)	-.0134* (.00625)	.245	3.35	35
	Reid-Provident	.0421	-.000193 (.00032)	.00000241 (.00001)	-.00126 (.00256)	.379	2.84	18
	Wyeth	.0121	.00212*** (.00033)	-.0000464*** (.00001)	-.0206*** (.00256)	.933	46.53	14
	Purepac	.0261	-.00644* (.00349)	.000129 (.00008)	.0661** (.0312)	.487	2.84	13
	Amid	.0111	.00309*** (.00103)	-.0000687** (.00003)	-.0289*** (.00703)	.785	9.72	12
	All Other	.0332	-.000269 (.00164)	.00000148 (.00003)	-.0133 (.0165)	.242	2.77	30
Tetracycline, 500 Mg. Capsules/ Tablets	Lederle	.0660	-.000496*** (.00015)	.00000854*** (.00000)	.000767 (.00128)	.654	19.53	35
	Robins	.0634	-.000179* (.00010)	.344 x 10^-6 (.00000)	.00285*** (.00092)	.559	13.10	35
	S.K.F.	.0477	-.000767*** (.00015)	.00000139*** (.00000)	.000346 (.00124)	.815	46.95	36
	Squibb	.0683	-.000195 (.00019)	.000000407 (.00000)	-.000512 (.00166)	.449	8.71	36
	Pfipharmecs	.0589	-.000195 (.00013)	.000000173 (.00000)	.00233* (.00113)	.282	4.18	36
	Wyeth	.0368	-.000474*** (.00010)	-.00000870*** (.00000)	.00209** (.00082)	.558	13.90	37
	Amid	.0403	-.000498** (.00022)	.0000158** (.00001)	-.00143 (.00152)	.486	6.63	25
	All Other	.0334	-.0000116 (.00029)	-.756 x 10^-6 (.00001)	.000328 (.00313)	.087	0.76	28

*Significant at the .10 level

**Significant at the .05 level

***Significant at the .01 level

than is understood by these somewhat simple-minded hypotheses. The correlational findings indicate that some of the higher-priced manufacturers came up in price and that as many of the lower-priced manufacturers came down in price as went up. Whereas we find evidence for MAC-related effects on industry price levels, we clearly do not understand the market dynamics well enough to adequately explain the results.

Relationships of the same kind were estimated for two sole-source products--three dosage forms of diazepam and four dosage forms of propoxyphene napsylate. Diazepam or Valium is generally considered to be a substitute for chlordiazepoxide, and propoxyphene napsylate or Darvon-N is generally thought to be a substitute for propoxyphene. Of course, both Valium and the leading, higher-priced brand of chlordiazepoxide are manufactured by Lilly; and both Darvon-N and the leading, higher-priced brand of propoxyphene are manufactured by Roche. In Section 3.0, we had suggested that manufacturers might boost their prices on sole-source products in order to make up for revenue reductions on the MAC products. The results here give at least some evidence for that hypothesis. We see from Table 5-29 that significant increases in the price level for two dosage forms of diazepam are associated with implementation of the MAC on chlordiazepoxide, and that an increase in the price level for one dosage form of propoxyphene napsylate is associated with implementation of the MAC on propoxyphene HCl. Thus, the MAC-related savings reported elsewhere in this study may be offset in part by MAC-related increases in reimbursement for non-MAC products. However, it is not appropriate to draw strong inferences from such comparatively crude empirical results. The results should nevertheless be sufficient to demonstrate that the prospect can not be dismissed at this time.

6.0 AN ECONOMETRIC ANALYSIS OF MEDICAID DRUG REIMBURSEMENT
EXPERIENCE IN THE STATES

This section describes econometric or multivariate analyses that use time-series data from the states to model Medicaid drug reimbursement experience, seeking a statistical relationship between state aggregate reimbursement experience and drug program characteristics in each state. Whereas the sample state analyses described in Section 5.0 constitute the principal analytic thrust of this evaluation, the sample size for such more comprehensive analysis was quite small, just five states. Of course, it is somewhat difficult to generalize from the sample state analyses to the entire nation. We believe that this econometric investigation furnishes a useful guide in generalizing EAC-related results from the sample state analyses to the nation as a whole, and permits a more reliable determination of potential effects on dispensing fee levels than was possible from the sample state analyses.¹ However, as often happens in econometric modeling, one does not always have the ideal data set for estimating the model. That was certainly true in this case. Some variables were measured imperfectly (e.g., Medicaid enrollment) and others were not measured at all (e.g., the actual prescription size) and had to be proxied or controlled indirectly. In estimating a model, one must remain sensitive to such empirical problems and indicate appropriate caveats in interpreting the results. Although improper inference from analysis is always a possibility, this risk must be weighed against the potential benefits of analysis. In any event, the econometric study

¹Data limitations precluded multivariate estimation of MAC-related effects. Since only a comparative handful of MACs had been promulgated during the interval examined by this study, the hypothesized cost-decreasing effect of these MACs would have been swamped by uncontrolled or stochastic variation in aggregate reimbursement experience.

described herein should not be viewed as definitive. It is merely a "first-generation" model and no doubt the state-of-the-art in this area can and should be advanced much further.

The following variables of interest are modeled empirically:¹

- average reimbursement per prescription,
- average annual drug cost per recipient,
- average number of prescriptions per recipient,
- average ingredient cost per prescription, and
- the dispensing fee level.

However, these variables are themselves interrelated and, strictly speaking, it is not possible to estimate reduced-form relationships for them without first specifying the underlying structural or simultaneous model.² Furthermore, such a structural model must itself be estimated and favorably evaluated if the reduced-form relationships that derive from it are to have validity.

Much of the data for this econometric effort came from the Survey of State Medicaid Drug Benefit Programs (see Section 4.0). Recall that the

¹We had originally also sought to investigate the determinants of administrative costs per prescription. However, the requisite data could not be obtained. A pharmacy participation rate model was estimated in preliminary analyses, using the subjective and unsubstantiated participation rate estimates obtained from the Survey of Medicaid Drug Programs (see Section 4.0). Although the estimated relationship was significant overall and explained 36 percent of the variation, closer examination revealed that some coefficient estimates were clearly spurious. For example, the results indicated a four percentage point reduction in the participation rate in 1977, even though the average reported rate had only fallen a few tenths of a percentage point.

²The structural form of a model is the set of behavioral relations--the ones derived from economic theory. The reduced form of a model is derived from the structural form and is the set of relations expressing the equilibrium impact of each exogenous variable on each of the variables being modeled, after taking account of "feedback" or "multiplier" effects.

survey obtained the following kind of information on MAC-EAC and other drug reimbursement parameters for a five-year interval, 1974-1978:

- basis for Estimated Acquisition Cost,
- existence of mini-MAC programs,
- program restrictions,
- existence of copayment, and
- type and amount of dispensing fee.

Other data used in this study (e.g., the drug reimbursement and Medicaid recipient statistics data) came primarily from federal sources.

6.1 The Model

A multiequation, simultaneous system of equations is developed below. It broadly attempts to model supply and demand behavior with respect to the average number of prescriptions per Medicaid recipient.¹ Nevertheless, the specification of any analytic model, especially a multiequation model, is somewhat arbitrary. For this reason, a number of alternative specifications could conceivably be equally compelling. Furthermore, the specification of a model was necessarily constrained by availability of the data required for estimation.

The basic model includes two behavioral relations--a demand function (RX) and an inverse supply function (PRICE). The variables included in each are indicated in Table 6-2; they are defined in Table 6-1. Analytically, these relationships constitute a simultaneous-equations set because the dependent variables--RX and PRICE--are assumed to be endogenously determined. That is, each of these variables is a reciprocal function of the

¹The definition of Medicaid recipient is considered in Section 6.3.

Table 6-1

VARIABLE DEFINITIONS

Dependent Variables

PRICE -- Average Medicaid prescription price

RX -- Average annual number of Rxs per FTE recipient

COST -- Average annual drug cost per FTE recipient

FEE -- Fee amount, in flat fee states

INGRED -- Estimated ingredient cost in flat fee states, equal to PRICE minus
FEE

Program Restrictions -- Dummy variables indicating:

RX LIMIT -- Existence of limit on the number of prescriptions per recipient

\$ LIMIT -- Existence of limit on the total drug cost per recipient

SIZE LIMIT -- Existence of limits on the size of prescriptions

PRIOR AUTHORIZATION -- Prior authorization required to fill certain prescrip-
tions

COPAY -- Requirement of recipient co-payment

CLOSED FORMULARY -- Existence of a closed formulary

Substitution -- Dummy variables indicating:

IF MD APPROVES -- Substitution allowed if approved by the physician

UNLESS MD FORBIDS -- Substitution allowed unless physician has forbidden
it

Fee Type -- Dummy variables indicating:

MULTIPLE FLAT -- Flat fee varies by type of pharmacy

MARKUP -- Fee varies with the level of ingredient cost

MARKET -- No fee, either paid as billed or usual and customary

Table 6-1

VARIABLE DEFINITIONS
(continued)

Basis for Ingredient Cost -- Dummy variables indicating:

AWP -- Average wholesale price (AWP) used to determine ingredient reimbursement

AWP LESS DISCOUNT -- Average wholesale price less a percentage discount used to determine ingredient cost reimbursement

LOCAL WHOLESALE -- Prices supplied by local wholesalers used to determine ingredient cost reimbursement

DIRECT -- Direct purchase prices used to determine ingredient cost reimbursement for selected products

QUANTITY -- Average wholesale prices for large quantities used to determine ingredient cost reimbursement for selected products

FEDERAL DECILE -- Federal decile data used to determine ingredient cost reimbursement

AAC -- Actual acquisition cost used for ingredient cost reimbursement

MINI-MAC -- Existence of state MAC program

USUAL AND CUSTOMARY -- Usual and customary limits on reimbursement

Recipient Characteristics

FEMALE -- Proportion of Medicaid recipients who are female

BLACK -- Proportion of Medicaid recipients who are black

ELDERLY -- Proportion of Medicaid recipients who are 65 years of age or older

DISABLED -- Proportion of Medicaid recipients who are either blind or have permanent and total disability

ADULT AFDC -- Proportion of Medicaid recipients who are adults in families receiving AFDC

OTHER -- Proportion of Medicaid recipients in all other eligibility categories (also excluding AFDC children)

PHYS VISITS -- Average annual number of physician visits per FTE recipient

MEDICAID -- Medicaid recipients as a proportion of the total state population

Table 6-1

VARIABLE DEFINITIONS
(continued)

Demographic Variables

INCOME -- Per capita income

URBAN -- Proportion of state population living in urban areas

PHARMACY DENSITY -- Number of pharmacies subscribing to Pharmacy Times
divided by total state population (in 1000s)

Year -- Dummy variables indicating:

Y1975 -- Equal to 1 in 1975-1978, equal to 0 in 1974

Y1976 -- Equal to 1 in 1976-1978, equal to 0 in 1974 and 1975

Y1977 -- Equal to 1 in 1977 and 1978, equal to 0 in 1974-1976

Y1978 -- Equal to 1 in 1978, equal to 0 in 1974-1977

Table 6-2
STRUCTURAL EQUATION SPECIFICATIONS

Independent Variable	RX	Dependent Variable		
		PRICE	FEE	INGRED
<u>Endogenous Variables</u>				
RX	X	X	X	X
PRICE				X
FEE				X
INGRED		X		
<u>Program Restrictions</u>				
RX LIMIT	X			
\$ LIMIT	X			
SIZE LIMIT		X		X
PRIOR AUTHORIZATION	X	X		X
COPAY	X			
CLOSED FORMULARY	X			X
<u>Substitution</u>				
IF MD APPROVES	X			
UNLESS MD FORBIDS	X			X
<u>Fee Type</u>				
MULTIPLE FLAT	X			
MARKUP	X			
MARKET	X			
<u>Basis for Ingredient Cost</u>				
AWP		X		
AWP LESS DISCOUNT		X		X
LOCAL WHOLESALE		X		X
DIRECT		X		X
QUANTITY		X		X
FEDERAL DECILE		X		X
AAC		X		X
MINI MAC		X		X
USUAL AND CUSTOMARY		X		X
<u>Recipient Characteristics</u>				
FEMALE	X	X	X	X
BLACK	X	X	X	X
ELDERLY	X	X	X	X
DISABLED	X	X	X	X
ADULT AFDC	X	X	X	X
OTHER	X	X	X	X
PHYS VISITS	X			
MEDICAID	X	X	X	X
<u>Demographic Variables</u>				
INCOME		X	X	
URBAN	X	X	X	
PHARMACY DENSITY	X	X	X	
<u>Year</u>				
Y1975	X	X	X	X
Y1976	X	X	X	X
Y1977	X	X	X	X
Y1978	X	X	X	X

X--denotes included variables.

other--RX is a function of PRICE, and PRICE is a function of RX. If identified, such a simultaneous-equations system can be estimated by multiequation techniques. However, consider now the specifications for each of the structural equations and the rationales for hypothesizing the indicated relationships.

6.1.1 Demand Function

This relation models the average number of Medicaid-reimbursed prescriptions, a measure of quantity demanded per Medicaid recipient. As usual, demand is hypothesized to be inversely related to the price paid by the purchaser. However, Medicaid recipients in most states do not actually have to pay anything for prescriptions. The effective price to the recipient is non-zero only in those few states having copayment provisions, wherein the recipient is required to pay \$.25 or \$.50 out of pocket for each prescription. Thus, we hypothesize that average number of prescriptions varies inversely with the existence of a copayment requirement (COPAY). The average reimbursement per prescription (PRICE) is also included as a total price variable. The variable was initially thought to reflect the magnitude of the financial incentive to seek out a pharmacist who accepts Medicaid reimbursement. That is, the higher the price, the less likely it would be that a Medicaid-eligible pays for a prescription out of pocket--in which case the prescription would not be reflected by the Medicaid quantity variable (RX). A positive coefficient was therefore hypothesized for this price-like variable. However, as will be seen, the results are not consistent with this hypothesis. We shall conclude that PRICE is more nearly a proxy for the average size of prescriptions, an otherwise omitted variable. Of course, the larger a prescription--and the higher the prescription's price

or cost--the lesser will be the number of prescriptions required to supply the same quantity of medication.

The pharmacy density variable is assumed to proxy consumer "access" to a pharmacy. Someone is less likely to have a prescription filled if it is inconvenient to do so. If a state has more pharmacies relative to population than another, the average distance to a pharmacy is presumably less. Thus, a positive coefficient is predicted for the pharmacy density variable. The urban variable serves a similar function and is likewise hypothesized to have a positive coefficient.

The Medicaid age (ELDERLY), sex (FEMALE), race (BLACK), and eligibility (DISABLED, ADULT AFDC, and OTHER) distribution variables are included to control for differences in the "need" and demand for prescription drugs related to these recipient characteristics.¹ For example, children, the elderly, women, and the disabled are thought to have a greater demand for prescription drugs. In addition, the MEDICAID variable--Medicaid eligibles as a proportion of the total state population--is included in order to control for differences between the states in the stringency of eligibility criteria. No specific hypothesis was indicated. The number of physician visits per Medicaid eligible is also included. Since it was not our purpose to explain physician utilization, the physician visit variable was taken as being exogenous. We assumed that medication and physician visits were complements and therefore predicted a positive relation between RX and PHYS VISITS.

The RX LIMIT, \$ LIMIT, and CLOSED FORMULARY variables indicate program constraints on the extent and scope of demand for Medicaid reimbursable

¹ AFDC children is the omitted eligibility category.

prescriptions. However, prior authorization provisions were expected to somewhat mitigate the effects of formulary and prescription limitations.

Finally, year-specific dummy variables (Y1975, Y1976, Y1977, and Y1978) were included to allow for any omitted variables or unmeasured factors that vary over time but are common to all or most states (e.g., a general tendency to reduce drug use over time). The year variables are specified so as to elicit the incremental effect in each year.

6.1.2 Inverse Supply Function

The average reimbursement or PRICE equation is formally an inverse supply function. That is to say, it expresses the "supply" price--equal to average reimbursement or PRICE--as a function of the quantity supplied--both the number of prescriptions per Medicaid recipient (RX) and the number of Medicaid recipients as proportion of total population (MEDICAID). As usual, it was hypothesized that the supply price varies directly with the quantity supplied--i.e., it varies directly with both RX and MEDICAID. However, the RX variable could also be an indirect measure of prescription size. The smaller the average prescription size, the greater is the number of prescriptions required. Of course, ingredient cost and thus reimbursement vary directly with the average prescription size. We therefore also predict that PRICE will be lower in programs having size limits (SIZE LIMIT).

Variables indicating the basis for ingredient cost were included to test for the cost-controlling effects of EAC-related changes in drug reimbursement. A lower basis for estimating the acquisition cost of ingredients was hypothesized to reduce reimbursement. It was further hypothesized that reimbursement would be reduced by mini-MAC programs. Any effect of the federal MAC program should be reflected by the coefficients elicited for the

year-specific dummy variables.¹ However, it is not possible to reliably distinguish such effects. Only a handful of MACs were implemented during the 1974-1978 interval examined by this study; the hypothesized cost-decreasing effect of these MACs would be "swamped" by other uncontrolled factors varying over time. Fee type variables were also included.

Two variables indicating the status of substitution legislation--IF MD APPROVES and UNLESS MD FORBIDS--were included to allow for the potential cost-saving effects associated with increased substitution of lower-priced generic drugs in states permitting substitution. Such states were predicted to have lower average reimbursement levels. It was also hypothesized that price levels would be lower in a more competitive market. For this reason we had hoped to include a variable indicating the existence of restrictions on advertising. Cady (1975) found that prescription prices were lower in states without such restrictions. However, information on the existence of advertising restrictions was not available for the 1974-1978 interval.

The per capita income variable (INCOME) is assumed to proxy regional variation in the labor costs of dispensing drugs. Thus, we anticipate that PRICE would vary directly with per capita income. The URBAN variable is included to allow for economies of scale in areas having greater population density. Also, price competition should be a more important factor in urban areas. Unfortunately, information giving the chain vs. nonchain and size distribution of pharmacies could not be found. However, we hypothesize that the PHARMACY DENSITY variable indirectly reflects variation in the size

¹ Although there unquestionably is some variation across the states in the actual implementation dates for the MAC program, we could not obtain reliable information as to those dates.

distribution; states having a greater pharmacy-to-population ratio may be expected to have smaller pharmacies and therefore higher acquisition and dispensing costs.

The recipient characteristic variables, except for PHYS VISITS, are included to control for potential differences in the type of prescriptions dispensed to various demographic and Medicaid-eligible groups. The year-specific variables are included to capture otherwise uncontrolled year-to-year differences (e.g., the effects of inflation on the overall drug price level).

6.1.3 Dispensing Fee and Ingredient Cost Functions

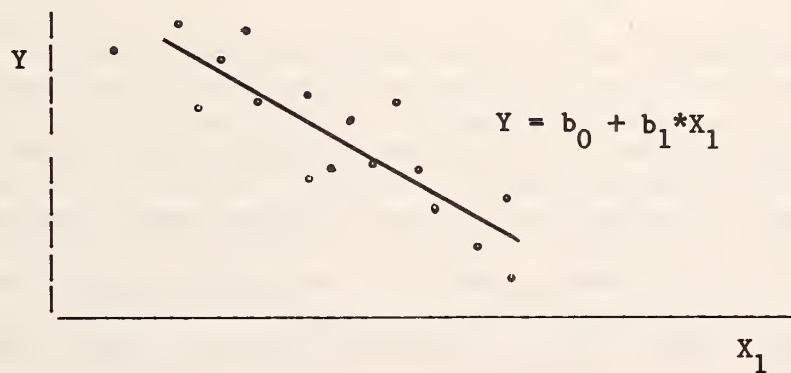
Given the total reimbursement amount, the manner in which it is determined should be irrelevant to pharmacy supply behavior. It is nevertheless also interesting to model the dispensing fee (FEE) and average ingredient cost (INGRED) components. We have by definition that the average reimbursement equals the dispensing fee plus ingredient costs (i.e., that PRICE = FEE + INGRED). Consequently, the reimbursement relation can be arbitrarily decomposed into separate relations for FEE and INGRED as long as these variables are also reciprocal functions of one another. However, the relations have been specified in Table 6-2 as if they were behavioral relations for the "true" dispensing and ingredient cost levels. If FEE and INGRED do not in fact fairly reflect their conceptual counterparts, we should expect to find a significant relationship between the two variables. For example, EAC-related reductions in ingredient cost reimbursement might also be found to lead to changes in dispensing fees.

The behavioral or structural model considered above is estimated using two-stage-least-squares.¹ This is done primarily in order to validate the overall model--i.e., to demonstrate that the structural specification is an analytically meaningful one. However, it is more relevant for policy purposes to estimate and examine the reduced-form equations using ordinary least squares; all endogenous variables are omitted in estimating such reduced-form relations. Formally, reduced-form equations are derived from the structural equations by solving for each of the endogenous variables so as to eliminate other endogenous variables from the right-hand side. This is accomplished in much the same way that n linear relations are used to solve for n unknowns, except that the unknowns still remain a function of

¹ Lacking prior information on the parametric or functional form of such relationships, it is customary to estimate them in linear form as shown below:

$$Y = b_0 + b_1 * X_1 + b_2 * X_2 + b_3 * X_3 + \dots$$

In a bivariate model--e.g., $Y = b_0 + b_1 * X_1$ --this would simply involve finding the "best" possible linear fit to the scatter of actual data points, as shown below:



The b_0 -coefficient is the intercept and the b_1 -coefficient is the slope of the line. The situation is perfectly analogous in the multivariate case. One is seeking the best possible linear fit between the dependent variable and all independent variables in the model. The estimated coefficients--the b 's--represent slope estimates for each independent variable, holding all other independent variables constant. The coefficients are tested for statistical significance and reviewed for quantitative importance.

the exogenous variables. The reduced-form equations generally give the more policy-relevant information because reduced-form coefficients give the equilibrium impact of a change in any exogenous variables on any endogenous variable. For example, the coefficient in the reimbursement price (PRICE) relation reflects not only the direct impact on reimbursement but also its effect on the number of prescriptions (RX) and its effect on "price." That is, it reflects not only the direct effect of having a closed formulary on PRICE, but also its impact on RX and its impact on PRICE. However, because of such "feedback" effects, it is difficult to gauge whether or not reduced-form results are consistent with expectations. This is usually more readily done in the context of the structural relations.¹

A reduced-form relationship is also estimated for the average annual drug cost per Medicaid recipient, wherein the dependent variable (COST) is simply equal to the product of PRICE (average reimbursement per prescription) and RX (the average annual number of prescriptions per Medicaid recipient). This COST model not only gives more straightforward estimates for the total cost-controlling impact of various drug program

¹ Simultaneity is not the only statistical problem that the analysis confronts. As usual in cross-section/time-series data, we have reason to hypothesize the existence of serial autocorrelation. That is, the regression residuals for each state are likely to be correlated across time. This happens because the model itself is incomplete. While we have extensive information on state reimbursement policies, it is nevertheless likely that some relevant differences between the states are not captured in the model. Formally, such factors are omitted variables. Although a well-specified model lessens the severity of the serial autocorrelation problem, it can rarely be solved by giving attention to specification alone. One alternative is to use an econometric procedure that takes account of it. We attempted to use the "fixed effects" procedure attributable to Mundlak. This procedure essentially incorporates a dummy variable for each of the states, except one, to pick up the unobserved differences between states. It necessarily assumes that the "state effects" are fixed and do not vary over time. However, the technique is extraordinarily sensitive to errors-in-variable problems and did not give satisfactory results.

attributes, but it also avoids the ambiguities associated with not having information on the average prescription size. In addition, more data were available for estimation of the COST relation.

6.3 Data

Perhaps one of the thorniest problems confronting analysis of the Medicaid program is measurement of the Medicaid-eligible population. Unfortunately, there is not any thoroughly satisfactory alternative for this purpose. As a practical matter, we use the average monthly number of Medicaid recipients as the denominator in computing the average annual number of prescriptions (RX) and the average annual drug cost (COST). We believe that the monthly figures measure more dependably the "full-time equivalent" user population than do the unduplicated annual counts of Medicaid recipients. In particular, the monthly data would reflect variation in the average duration of Medicaid eligibility. Statistics on the average monthly number of recipients were missing for two states in 1974 and for one state each in 1975 and 1976. These missing values were estimated, either by interpolating or taking the value for an adjoining year. Except for missing recipient denominator information, missing dependent variables were not estimated.

Cross-sectional state data were sought for five years, 1974 through 1978. Of course, Arizona and Wyoming were excluded, not having Medicaid drug programs. Hawaii and Alaska were also excluded, primarily because of a concern that the behavioral situations in those states were different. Also, no drug reimbursement data were available for Alaska. In addition, drug reimbursement data were not available in 1974 for Colorado, New York, Rhode Island, and South Dakota. Furthermore, the reimbursement data for Oklahoma and Oregon were judged implausible, and those states are likewise excluded

from the analysis. However, the District of Columbia is included. A total of 221 usable cases were available for estimating the COST model.

Missing data problems were even more severe with respect to the number of prescriptions dispensed annually. Maine, New York, and Rhode Island did not report this information in any year. Furthermore, only 21 study states reported usable prescription data in all five years. One state reported prescriptions for just one year, seven states reported it for three years, and 11 states reported prescriptions for only four years. Reporting problems were greatest in 1978.¹ A total of 177 cases remained for estimation of the RX and PRICE models.²

In order to maintain reasonable sample size, all missing values among the independent variables were replaced. In most cases (e.g., recipient distribution variables such as FEMALE, ELDERLY and DISABLED) we used the average for that state, calculated for the years in which data were available. However, other missing value replacement algorithms were also used. For example, missing per capita income data in 1974 were taken to be the same as those in 1975. In a very few instances where a variable was not available in any year for a given state (e.g., PHYS VISITS in one or two states), the sample average was substituted.

6.4 Results

The structural equation estimates are shown in Table 6-3, and the reduced-form results are given in Table 6-4. Although the results are superficially quite good--in terms of variation explained, overall significance, and general consistency of the parameter estimates with expectations--

¹More complete data will subsequently become available for 1978.

²PRICE is actually derived as COST divided by RX.

Table 6-3

STRUCTURAL EQUATIONS
 (Standard deviations in parentheses and significance levels in < >.)

Independent Variable	Dependent Variable			
	PRICE (N=177)	RX (N=177)	FEE (N=127)	INGRED (N=127)
<u>Endogenous Variables</u>				
PRICE	--	-1.86 (0.886) <0.0375>	--	--
RX	-0.104 (0.0442) <0.0196>	--	-0.00398 (0.00898) <0.659>	-0.151 (0.0645) <0.0209>
FEE	--	--	--	-1.87 (1.50) <0.218>
INGRED	--	--	0.125 (0.0405) <0.0026>	--
<u>Program Restrictions</u>				
RX LIMIT	--	1.25 (0.950) <0.190>	--	--
\$ LIMIT	--	-2.60 (1.32) <0.0507>	--	--
SIZE LIMIT	-0.353 (0.149) <0.0195>	--	--	-0.0439 (0.302) <0.885>
PRIOR AUTHORIZATION	-0.136 (0.178) <0.445>	0.946 (0.996) <0.344>	--	-0.161 (0.263) <0.543>
COPAY	--	-1.02 (1.21) <0.401>	--	0.924 (0.150) <0.0001>
CLOSED FORMULARY	--	-1.50 (0.984) <0.130>	--	-0.756 (0.277) <0.0075>
<u>Substitution</u>				
IF MD APPROVES	-0.330 (0.203) <0.106>	--	--	-0.381 (0.279) <0.175>
UNLESS MD FORBIDS	-0.105 (0.183) <0.567>	--	--	-0.0455 (0.312) <0.884>
MULTIPLE FLAT	-0.182 (0.272) <0.506>	--	--	--
MARKUP	0.104 (0.207) <0.615>	--	--	--
MARKET	-0.138 (0.368) <0.707>	--	--	--
<u>Basis for Ingredient Cost</u>				
AWP	0.0737 (0.123) <0.550>	--	--	-0.0236 (0.222) <0.915>
AWP LESS DISCOUNT	0.360 (0.271) <0.187>	--	--	0.483 (0.333) <0.151>
LOCAL WHOLESALE	-0.444 (0.138) <0.0015>	--	--	-0.457 (0.195) <0.0211>

Table 6-3 (con't)

STRUCTURAL EQUATIONS
 (Standard deviations in parentheses and significance levels in <>)

Independent Variable	Dependent Variable			
	PRICE (N=177)	RX (N=177)	FEE (N=127)	INGRED (N=127)
DIRECT	-0.487 (0.141) <0.0007>	--	--	-0.904 (0.443) <0.0441>
QUANTITY	0.600 (0.203) <0.0036>	--	--	0.517 (0.347) <0.139>
FEDERAL DECILE	-0.026 (0.232) <0.912>	--	--	0.161 (0.325) <0.622>
AAC	-0.294 (0.182) <0.109>	--	--	-0.652 (0.265) <0.0158>
MINI MAC	-0.0777 (0.173) <0.655>	--	--	0.0261 (0.260) <0.920>
USUAL AND CUSTOMARY	0.0512 (0.180) <0.777>	--	--	0.313 (0.293) <0.288>
Recipient Characteristics				
FEMALE	1.32 (0.594) <0.0280>	8.36 (3.35) <0.0137>	0.574 (0.366) <0.120>	3.10 (2.03) <0.131>
BLACK	0.235 (0.358) <0.514>	4.70 (1.90) <0.0146>	-0.303 (0.0952) <0.0019>	0.0340 (0.597) <0.955>
ELDERLY	2.47 (0.672) <0.0003>	4.89 (4.07) <0.231>	-0.272 (0.234) <0.248>	2.11 (1.01) <0.0388>
DISABLED	-2.72 (1.12) <0.0160>	-2.05 (6.59) <0.757>	0.748 (0.353) <0.0365>	-1.90 (1.68) <0.262>
ADULT AFDC	-1.07 (0.675) <0.116>	-4.58 (3.58) <0.202>	-0.172 (0.239) <0.473>	-1.13 (0.880) <0.203>
OTHER	3.68 (1.09) <0.0009>	12.8 (6.51) <0.0514>	-1.11 (0.368) <0.0032>	3.03 (1.73) <0.0838>
PHYS VISITS	--	-0.0380 (0.0942) <0.687>	--	--
MEDICAID	-0.0122 (0.00648) <0.0618>	-0.126 (0.0302) <0.0001>	-0.00386 (0.00155) <0.0143>	-0.0188 (0.0143) <0.190>
Demographic Variables				
INCOME	0.0000505 (0.0000118) <0.669>	--	0.0000717 (0.0000372) <0.0564>	--
URBAN	0.0493 (0.170) <0.773>	-1.31 (1.02) <0.199>	0.125 (0.0482) <0.0105>	--
PHARMACY DENSITY	1.84 (1.16) <0.117>	13.7 (5.98) <0.0237>	0.174 (0.362) <0.632>	--

Table 6-3 (con't)

STRUCTURAL EQUATIONS
 (Standard deviations in parentheses and significance levels in < >)

Independent Variable	Dependent Variable			
	PRICE (N=177)	RX (N=177)	FEE (N=127)	INGRED (N=127)
<u>Year</u>				
Y1975	0.465 (0.192) <0.168>	2.23 (1.17) <0.0580>	0.0435 (0.0726) <0.550>	0.645 (0.328) <0.0518>
Y1976	0.625 (0.183) <0.0008>	2.16 (1.24) <0.0842>	-0.0239 (0.0699) <0.734>	0.483 (0.273) <0.0797>
Y1977	0.372 (0.203) <0.0692>	0.257 (1.18) <0.827>	0.0469 (0.0742) <0.528>	0.720 (0.365) <0.0512>
Y1978	0.480 (0.187) <0.0110>	1.14 (1.30) <0.384>	0.153 (0.0664) <0.0228>	0.644 (0.407) <0.117>
<u>SUMMARY STATISTICS</u>				
R-Square	0.6510	0.2906	0.5981	0.5230
F-Ratio	8.72	3.20	10.23	4.02

Table 6-4
REDUCED-FORM EQUATIONS
 (Standard deviations in parentheses and significance levels in < >)

Independent Variable	Dependent Variable				
	PRICE (N=171)	RX (N=171)	COST (N=221)	FEE (N=127)	INGRED (N=127)
<u>Program Restrictions</u>					
RX LIMIT	0.323 (0.131) <0.0151>	0.249 (1.21) <0.837>	4.79 (5.30) <0.367>	0.0958 (0.0645) <0.141>	0.116 (0.158) <0.467>
\$ LIMIT	-0.236 (0.187) <0.208>	-2.72 (1.72) <0.115>	-15.6 (6.92) <0.0251>	-0.187 (0.0995) <0.0627>	0.228 (0.244) <0.352>
SIZE LIMIT	-0.0169 (0.138) <0.903>	0.779 (1.27) <0.541>	5.05 (5.23) <0.335>	-0.0498 (0.0721) <0.492>	-0.355 (0.177) <0.0477>
PRIOR AUTHORIZATION	-0.418 (0.131) <0.0017>	2.37 (1.20) <0.0513>	4.78 (4.76) <0.317>	-0.0472 (0.0688) <0.495>	-0.364 (0.169) <0.0340>
COPAY	0.929 (0.140) <0.0001>	-2.87 (1.29) <0.0273>	-8.60 (5.68) <0.132>	0.140 (0.0610) <0.0245>	0.924 (0.150) <0.0001>
CLOSED FORMULARY	-0.319 (0.130) <0.0150>	-1.63 (1.19) <0.173>	-14.9 (5.30) <0.0055>	-0.00653 (0.0554) <0.906>	-0.109 (0.136) <0.424>
<u>Substitution</u>					
IF MD APPROVES	-0.369 (0.166) <0.0277>	0.471 (1.52) <0.758>	-3.34 (6.44) <0.605>	0.0142 (0.0682) <0.836>	-0.181 (0.168) <0.284>
UNLESS MD FORBIDS	-0.331 (0.148) <0.0271>	0.346 (1.36) <0.800>	-3.39 (5.79) <0.560>	0.102 (0.0696) <0.145>	-0.0890 (0.171) <0.604>
<u>Fee Type</u>					
MULTIPLE FLAT	-0.216 (0.216) <0.319>	2.18 (1.98) <0.273>	4.06 (8.42) <0.631>	NA	NA
MARKUP	0.242 (0.166) <0.147>	-1.45 (1.53) <0.345>	-8.29 (6.33) <0.192>	NA	NA
MARKET	-0.334 (0.302) <0.270>	2.46 (2.77) <0.376>	5.95 (12.9) <0.646>	NA	NA
<u>Basis for Ingredient Cost</u>					
AWP	0.0553 (0.0999) <0.581>	0.0604 (0.918) <0.948>	0.729 (4.23) <0.863>	-0.00474 (0.0501) <0.925>	0.146 (0.123) <0.239>
AWP LESS DISCOUNT	0.327 (0.195) <0.0957>	-3.22 (1.79) <0.0743>	-7.13 (8.44) <0.399>	0.0992 (0.0824) <0.232>	0.440 (0.202) <0.0322>
LOCAL WHOLESALE	-0.424 (0.106) <0.0001>	0.804 (0.976) <0.412>	-7.94 (4.21) <0.0606>	-0.0139 (0.0473) <0.769>	-0.332 (0.116) <0.0053>
DIRECT	-0.421 (0.116) <0.0004>	-0.722 (1.07) <0.499>	-11.5 (4.52) <0.0115>	-0.242 (0.0523) <0.0001>	-0.300 (0.129) <0.0217>
QUANTITY	0.904 (0.168) <0.0001>	-1.18 (1.54) <0.446>	17.4 (6.34) <0.0066>	0.182 (0.0679) <0.0087>	0.460 (0.167) <0.0070>
FEDERAL DECILE	-0.295 (0.174) <0.0917>	2.20 (1.60) <0.170>	8.46 (6.81) <0.215>	-0.0186 (0.0687) <0.787>	-0.199 (0.169) <0.241>
AAC	-0.209 (0.144) <0.149>	0.318 (1.32) <0.810>	-5.00 (5.97) <0.404>	-0.0697 (0.0685) <0.311>	-0.447 (0.168) <0.0093>

Table 6-4 (con't)

REDUCED-FORM EQUATIONS
 (Standard deviations in parentheses and significance levels in < >)

Independent Variable	Dependent Variable				
	PRICE (N=177)	RX (N=177)	COST (N=221)	FEE (N=127)	INGRED (N=127)
MINI MAC	0.203 (0.147) <0.169>	-0.431 (1.35) <0.750>	0.549 (5.78) <0.925>	0.115 (0.0623) <0.0683>	-0.0501 (0.153) <0.744>
USUAL AND CUSTOMARY	-0.271 (0.144) <0.0622>	1.62 (1.32) <0.225>	4.18 (5.77) <0.470>	-0.0457 (0.0669) <0.496>	0.0115 (0.164) <0.944>
Recipient Characteristics					
FEMALE	1.05 (0.468) <0.0259>	7.33 (4.30) <0.0902>	25.5 (12.0) <0.0349>	0.555 (0.334) <0.0993>	0.551 (0.820) <0.503>
BLACK	-0.859 (0.265) <0.0015>	6.16 (2.43) <0.0123>	21.5 (9.88) <0.0305>	-0.379 (0.131) <0.0048>	-0.178 (0.322) <0.582>
ELDERLY	1.35 (0.551) <0.0153>	3.41 (5.06) <0.502>	63.6 (22.8) <0.0058>	0.120 (0.240) <0.619>	0.531 (0.591) <0.371>
DISABLED	-2.12 (0.897) <0.0192>	-2.73 (8.24) <0.741>	-54.2 (36.2) <0.136>	0.0126 (0.375) <0.973>	-0.592 (0.922) <0.523>
ADULT AFDC	-0.0111 (0.571) <0.985>	-1.59 (5.25) <0.762>	-36.0 (21.1) <0.0894>	-0.145 (0.273) <0.598>	-0.504 (0.671) <0.454>
OTHER	2.18 (0.915) <0.0182>	8.69 (8.40) <0.303>	101 (39.0) <0.0105>	0.0809 (0.426) <0.850>	2.49 (1.05) <0.0191>
PHYS VISITS	-0.00595 (0.0127) <0.639>	0.102 (0.116) <0.383>	0.487 (0.555) <0.382>	-0.116 (0.0586) <0.0514>	-0.0710 (0.144) <0.623>
MEDICAID	-0.00866 (0.00439) <0.0504>	-0.113 (0.0403) <0.0060>	-0.845 (0.169) <0.0001>	-0.00648 (0.00184) <0.0007>	0.00112 (0.00452) <0.805>
Demographic Variables					
INCOME	0.000274 (0.0000830) <0.0012>	-0.00167 (0.000762) <0.0297>	-0.000586 (0.00314) <0.852>	0.000138 (0.0000355) <0.0002>	0.000180 (0.0000872) <0.0418>
URBAN	-0.139 (0.141) <0.328>	-0.0839 (1.30) <0.949>	-4.60 (5.90) <0.437>	0.0375 (0.0531) <0.481>	-0.215 (0.130) <0.103>
PHARMACY DENSITY	0.199 (0.924) <0.830>	6.94 (8.49) <0.415>	38.9 (37.6) <0.303>	0.0105 (0.436) <0.981>	1.40 (1.07) <0.195>
Year					
Y1975	0.0860 (0.144) <0.550>	2.98 (1.32) <0.0254>	19.4 (6.04) <0.0016>	-0.0403 (0.0639) <0.530>	0.0887 (0.157) <0.574>
Y1976	0.408 (0.148) <0.0065>	1.16 (1.36) <0.395>	11.88 (6.15) <0.0563>	-0.00270 (0.0651) <0.967>	0.310 (0.160) <0.0553>
Y1977	0.294 (0.168) <0.0820>	1.15 (1.54) <0.456>	8.84 (6.69) <0.189>	0.0460 (0.0731) <0.530>	0.0258 (0.179) <0.886>
Y1978	0.480 (0.150) <0.0017>	0.452 (1.37) <0.743>	10.3 (5.60) <0.0683>	0.176 (0.0600) <0.0043>	0.326 (0.147) <0.0296>
SUMMARY STATISTICS					
R-Square	0.7698	0.3175	0.5074	0.7330	0.7965
F-Ratio	13.47	1.87	5.44	8.07	11.50

the analyses should not be regarded as decisive. While we are generally inclined to accept the significant findings, we do not believe that failure to reject the null hypothesis (i.e., insignificance) with respect to other variables is necessarily meaningful. The data and econometric problems were simply too severe.

6.4.1 Structural Equations

Although we shall emphasize the reduced-form results, we first consider the endogenous variables in the structural equations. To the extent appropriate, structural estimates for the exogenous variables will be considered in discussion of the reduced-form results.

Both RX and PRICE are found to be reciprocal, negative, and significant functions of one another. As already noted, we believe that these variables are simply proxying differences in the average prescription size--i.e., the higher the reimbursement amount, the greater the prescription size, and the larger the number of prescriptions, the smaller the average prescription size. On the other hand, the results are also consistent with competitive market assumptions, namely, the assumptions of a downward-sloping demand curve and an upward-sloping supply curve. We tend to discount this prospect. In order to accept it, one would have to believe that Medicaid recipients are motivated to conserve on Medicaid program expenses and actually respond to an increase in the Medicaid-reimbursed price by reducing the number of prescriptions filled at government expense.

The RX variable is statistically significant in the INGRED model but is not significant in the FEE equation. We regard this as further evidence that RX is merely proxying the average prescription size. If it were only a straightforward measure of quantity supplied, the opposite result

would have been expected--namely that the fee level, but not the average ingredient costs, declines with RX.

We found no strong relationship between the average ingredient cost (INGRED) and the fee level (FEE). However, we do find that the fee amount varies directly with ingredient costs. This result is consistent with a hypothesis that those states having a higher basis for reimbursement of ingredient cost are also more generous with respect to the amount of the dispensing fee. The reduced-form results also tend to support this view.

6.4.2 Reduced-Form Equations

As noted above, the reduced-form results give the more policy-relevant information. We discuss each equation in turn, beginning with the reduced-form PRICE model.

PRICE Equation. Almost 77 percent of the cross-section/time-series variation in the statewide average per-prescription reimbursement between 1974 and 1978 is explained by the estimated equation. Furthermore, 22 of the 35 independent variables (63 percent) are significant at the .10 level or better--and still more variables are nearly significant. Consider now the individual coefficients.

A limit on the number of prescriptions (RX LIMIT) is found to significantly increase the average prescription price. This probably reflects an increase in the average prescription size, as recipients and providers attempt to maintain the same level of medication with a limited number of prescriptions. The \$ LIMIT variable obtains a negative coefficient, as expected, but the result is not quite significant at the usual .10 level. Furthermore, a copayment requirement is found to significantly increase the average prescription price, probably also due to an increase in the average prescription size. Both closed formularies and prior authorization

requirements are estimated to significantly reduce the average reimbursement price.

Both kinds of substitution provisions--the one allowing substitution if approved by the physician and the other allowing it unless the physician has forbidden it--are found to reduce the average prescription reimbursement. The former, more restrictive approach (IF MD APPROVES) is estimated to achieve the greater savings--37¢ vs. 33¢ per prescription. However, the two estimates are not significantly different from one another.

A mark-up fee is estimated to increase the average prescription price. Although the result is not quite significant at the usual .10 level, it would appear to support the movement toward fixed fees. However, a similar result is not seen in the COST (average annual drug cost per recipient) model. In fact, the MARKUP coefficient in that model is negative, as it also is in the RX model.

Including MINI-MAC and USUAL AND CUSTOMARY, a total of nine variables were included that reflect differences in the basis for ingredient cost reimbursement.¹ Six of these variables are significant at the .10 level or better, and two more variables are nearly significant at that level. We estimate that average prescription prices are about 42¢ lower in states using either direct prices or prices supplied by local wholesalers, and that prices are 30¢ lower in states using the federal decile data.

¹ Almost all states have multiple bases for determination of ingredient cost reimbursement--e.g., AWP for some products, quantity prices for others, and direct purchase prices for still other products. Inasmuch as these categories are not mutually exclusive, it is not appropriate to omit one of them as is usually done in specification of categorical variables. The coefficients obtained should be viewed as giving the partial or "marginal" effect of each category relative to the average for the sample. Since a majority of the states use AWP to some extent, it should not be too surprising that the coefficient for AWP is insignificant.

However, we find that prices are 33¢ higher in states using AWP less discount and 90¢ higher in states using quantity prices. This latter result is counterintuitive, albeit very robust. We investigated the possibility of interactions and found none. We also corrected the data for what appeared to be some confusion among the states as to what constitutes quantity prices. As expected, usual and customary limits were also found to reduce prescription prices; the estimated reduction is 27¢. Although the estimates are not quite significant, states using actual acquisition cost as the basis for ingredient cost reimbursement or having state MAC programs were also found to have lower average prescription reimbursements, by 21¢ and 20¢ respectively.

The estimated coefficients for variables indicating the basis for ingredient cost reimbursement (excluding MINI-MAC) were used to simulate the impact of the EAC program. Assuming, unrealistically, that all changes in ingredient cost reimbursement since 1975 could in fact be attributed to EAC, we calculate that the overall effect has only been a 6.5¢ reduction in the average prescription price. More importantly, this estimate is not significantly different from zero; that is, a null hypothesis can not be rejected on the basis of this econometric analysis. This finding is generally consistent with our conclusion from independent analysis that EAC-related savings in the five study states were offset by dispensing fee increases.

All but two of the recipient characteristic variables are significant. Perhaps most interesting, the MEDICAID coefficient indicates that the average prescription price decreases as the relative size of the Medicaid population increases. This could reflect greater competition for the Medicaid market in such states; although "marginal" Medicaid recipients could also be purchasing lower-priced medications.

Of the three demographic variables--INCOME, PHARMACY DENSITY, and URBAN--only INCOME is significant. As expected, states having a higher per capita income--and higher wage level--are found to have higher prescription prices.

The year-specific coefficients do not indicate a definite pattern. However, it is noteworthy that the greatest price increase came in 1978. We believe that this largely reflects EAC-related fee adjustments in that year--as will be seen in discussion of the FEE equation.

RX Equation. Only 32 percent of variation in the quantity variable is explained, and only eight of the 35 independent variables included in this model (23 percent) are significant at the .10 level or better. Clearly, the specification of the RX model is much less complete than that of the PRICE model. This is perhaps to have been expected. The Survey of Medicaid Drug Programs was primarily concerned with drug reimbursement and collected no information on, for example, on the existence or extent of utilization review programs.

In general, we shall only comment on the significant or nearly significant findings. However, a notable null finding is unquestionably that obtained with respect to the PHYS VISITS variable. We had expected a strong positive relation between the number of prescriptions and the number of physician visits. Failure to find such a relationship might appear to debunk the conventional wisdom that physician visits are traditionally concluded with the writing of a prescription; however, we do not have sufficient confidence in the data to reach that conclusion. Further investigation is required. Other findings are generally more consistent with expectations. For example, a limitation on total drug expense (\$ LIMIT) is found to reduce the number of prescriptions. Furthermore, the existence of prior

authorization provisions is found to increase the number of prescriptions. That is, the number of prescriptions could be reduced if the states took a more inflexible approach. As predicted, copayment provisions are seen to significantly reduce the number of prescriptions. Also as expected, we estimate that fewer prescriptions are provided to recipients in states having a closed formulary. Although this result is significant at a high level, it is not significant at the usual .10 level.

States using AWP less discount as a basis for ingredient cost are found to have significantly fewer prescriptions per recipient. This could reflect a prescription size difference. In particular, AWP less discount may give greater incentive to dispense larger prescriptions. States subject to "usual and customary" reimbursement limitations or using federal decile prices are found to dispense more prescriptions per recipient. This could also reflect a greater financial incentive inherent in such behavior by the pharmacies.

The number of prescriptions demanded per recipient is significantly higher in states having a greater proportion of either black or female recipients. However, the average number of prescriptions demanded declines as the relative size of the Medicaid program (i.e., the number of Medicaid recipients relative to total state population) increases. Finally, the per-recipient level of demand for prescription drugs is lower in states having a higher per capita income.

COST Equation. In a sense, the COST relation is a composite of the PRICE and RX models, with COST (average annual drug cost per recipient) being equal to PRICE (average reimbursement per prescription) times RX (the average annual number of prescriptions per recipient). However, more observations were available for estimation of the COST model. Furthermore, the COST

relationship avoids ambiguities associated with lack of prescription size information. On the other hand, this relationship also reflects any specification problems with respect to the RX relation. The estimated relationship explains fifty-one percent of the variation, a level intermediate between that obtained for the PRICE and RX models. However, only 13 of the 35 independent variables (37 percent) are significant at the .10 level or better.

The significant findings are generally consistent with those already reported for either the RX or PRICE relations. A limit on total drug expense (\$ LIMIT) is found to reduce the annual drug cost per recipient. A closed formulary is seen to have a similar effect. In addition, copayment requirements are estimated to reduce total drug reimbursement per recipient, even though copayments had also been found to be associated with a greater reimbursement per prescription. States using either direct or local wholesale prices are found to have lower drug costs, and states using quantity prices again found to have higher costs. The latter result is at least consistent with the apparently anomalous finding above with respect to direct prices.

Recipient characteristic variables have the greatest significance in this model. We estimate that the total annual drug cost is greater in states having a larger proportion of female recipients, black recipients, or elderly recipients, or recipients in "other" eligibility categories. Drug costs are estimated to be lower in states having a greater proportion of disabled and adult AFDC recipients. Furthermore, we estimate that total drug expense per recipient decreases as the relative size of the Medicaid program increases. It is also noteworthy that the estimated increases in total reimbursement expense were greater in 1975 and 1976 than in either 1977 or 1978.

INGRED Equation. Almost 80 percent of the cross-section/time-series variation in estimated ingredient cost levels is explained. However, only 12 of the 32 explanatory variables (37 percent) are significant.¹ In general, the results are similar to those obtained in the PRICE equation. However, we now also estimate that a limit on prescription size reduces reimbursement of ingredient costs, due no doubt to a reduction in average prescription size. Although the closed formulary and substitution variables are not significant in the reduced-form equation, they are significant in the structural model. It may be noteworthy that the estimated increase in ingredient cost reimbursement in 1977 is very small, possibly due to EAC. However, the estimated increase in 1975 was similarly small.

FEE Equation. About 73 percent of the variation in state fee levels is explained, and 12 of the 32 variables (37 percent) are significant. As expected, fee levels are higher in states having higher per capita incomes, our proxy for pharmacy wage levels. Furthermore, fees are lower in states having a relatively larger Medicaid market. However, some other results are not so easy to interpret. Fee levels are higher in states having (i) a limit on the number of prescriptions, (ii) a copayment requirement, (iii) a mini-MAC program, (iv) relatively more female recipients, and (v) in those states using quantity prices as the basis for ingredient cost reimbursement. Fees were found to be lower in states having (i) a limit on the recipient's annual drug cost, (ii) relatively more black recipients and (iii) in those states using direct prices. However, the most salient finding is that obtained with respect to the year-specific variables. After controlling

¹The fee type variables are omitted, since analysis was necessarily limited to the fixed-fee states.

for other relevant differences (e.g., wage levels and recipient characteristics), dispensing fees were estimated to increase significantly by 17.6¢ in 1978; the fee increments estimated for 1975, 1976 and 1977 were not significant. No doubt this finding reflects fee adjustments engendered by the federal mandate for dispensing fee surveys.

6.5 Conclusions

This econometric investigation gives independent evidence for the following EAC-related conclusions:

- After controlling for other relevant differences (e.g., wage levels and recipient characteristics), dispensing fees were estimated to increase unexpectedly by 17.6¢ per prescription in 1978, due no doubt to the mandate for reassessment of dispensing fees.
- No significant EAC-related reduction in prescription reimbursement levels could be shown.

The analyses also affirm the cost-saving potential of substitution, copayment requirements, closed formularies, and various other program restrictions. Furthermore, much was learned about Medicaid drug reimbursement behavior. However, we must indicate reasonable caution with respect to all such findings. The data problems and limitations were severe.

BIBLIOGRAPHY

BIBLIOGRAPHY

Applied Management Sciences, Inc. An Analysis of State Drug Reimbursement Programs to Identify and Develop MAC Program Evaluation Options. A Final Report to the National Center for Health Services Research, Contract No. HRA 230-77-0077, 1978.

Cady, John F. Drugs on the Market. D.C. Heath, 1975.

Commanor, William S. "Research and Competitive Product Differentiation in the Pharmaceutical Industry in the United States," Economica, 31 (November, 1964): 372-84.

Dickens, Paul F., III. The Maximum Allowable Cost Regulations and Pharmaceutical Research and Development. DHEW Publication No. (SSA) 76-11701. Washington, D.C., United States Government Printing Office, March 4, 1976.

Dickens, Paul; and Timothy D. Hogan. The Maximum Allowable Cost Program and Wholesale Drug Prices: A Preliminary Analysis. Research and Statistics Note No. 11. Washington, D.C., Social Security Administration, July 12, 1977.

Eli Lilly and Company. "An Analysis of Evidence Supporting the Need for an Evaluation of MAC-Type Regulations as Public Policy," 1977. Federal Trade Commission, Drug Product Selection, Bureau of Consumer Protection, January, 1979.

Fulda, Thomas R. "Drug Cost Control: The Road to the Maximum Allowable Cost Regulations." In Friedman, Kenneth; and Stuart Rakoff. Toward a National Health Policy. Public Policy in the Control of Health Care Costs. Lexington Books, 1977. Pages 55-67.

Gagnon, Jean Paul and Raymond Jang. Federal Control of Pharmaceutical Costs: The MAC Experience, Roche Laboratories, 1979.

Gardner, Vince. "Maximum Allowable Cost-Estimated Acquisition Cost. The View from Washington," California Pharmacist 24 (1):36-39, July 1976.

Gumbhir, Ashok K.; and Christopher A. Rodowskas Jr. "Consumer Price Differentials Between Generic and Brand Name Prescriptions," American Journal of Public Health 64 (10):977-982, October 1974.

Harris, Robert L., and Bernard P. Donnelly. Medi-Cal Drug Price Controls, California Department of Finance, Report No. S78-4, November 4, 1977.

Herman, Colman M. and Edward J. Zabloski. "An Assessment of Prescription Dispensing Costs and Related Factors," . . .

Holahan, John. Financing Health Care for the Poor. D.C. Heath, 1975.

Hornbrook, Mark and John Rafferty. "Evaluation Protocol for the Maximum Allowable Cost (MAC) Program," unpublished, DHEW, circa 1977.

Horvitz, Richard A.; Morgan, John P.; and Fleckenstein, Lawrence. "Savings from Generic Prescriptions. A Study of 33 Pharmacies in Rochester, New York," Annals of Internal Medicine. 82(5): 601-607, May, 1975.

IMS America Ltd. Letter to Armistead Lee, Pharmaceutical Manufacturers Association, October 7, 1974.

Knapp, David A. and Francis B. Palumbo. Containing Costs in Third Party Drug Programs: Selected Bibliography and Abstracts. Hamilton, Illinois. The Hamilton Press, Inc., 1978.

Lee, Armistead M. Comparative Approaches to Cost Constraints in Pharmaceutical Benefits Programs. In Mitchell, Samuel A.; and Emery A. Link, Editors. Impact of Public Policy on Drug Innovation and Pricing. Proceedings of the Third Seminar on Pharmaceutical Public Policy Issues, December 1975. Washington, D.C., American University 1976. Pages 115-170.

Lingle, Earle W. Jr., and Jean Paul Gagnon. "A Comparison of Maximum Allowable Costs and Actual Acquisition Costs in North Carolina Pharmacies," paper presented before the Academy of Pharmaceutical Sciences, American Pharmaceutical Association, Hollywood, Florida, November 14, 1978.

MAC's here. F-D-C-Reports, November 19, 1974, pp. 3-15.

Mishan, E.J. Cost Benefit Analysis. Praeger Publishers, 1971.

Norwood, G. Joseph; David P. Lipson, Robert A. Freeman. "Policy Implications of Maximum Allowable Cost: Average Wholesale Price-Actual Acquisition Cost Differentials Among Pharmacies," Journal of the American Pharmaceutical Association (8):496-499, August 1977.

Pracon Incorporated, "An Analysis of Price Levels in the Federal Maximum Allowable Cost (MAC) Program and Their Impact on the Drug Marketplace," 1980.

Schankerman, Mark A. "Common Costs in Pharmaceutical Research and Development: Implications for Direct Price Regulation." In Mitchell, Samuel A. and Emery A. Link, Editors. Impact of Public Policy on Drug Innovation and Pricing, proceedings of the Third Seminar on Pharmaceutical Public Policy Issues, December 1975. Washington, D.C., American University, 1976. Pages 3-26.

Schwartzman, David. Innovation in the Pharmaceutical Industry. Baltimore, Johns Hopkins University Press, 1976.

Silverman, Milton and Mia Lydecker. "Prescription Drug Policy by Hospital Pharmacies: A Preliminary Study." American Journal of Hospital Pharmacy (31):870-875, September 1974.

Strom, Brian L.; Stolley, Paul D.; and Brown, Torrey C. Drug Anti-Substitution Studies. I: Estimation of Possible Savings by Repeal of Anti-Substitution Laws. Drugs in Health Care 1, (2): 99-103, Fall 1974.

Sudovar, Stephen G., Jr. and Susan D. Rein. Managing Medicaid Drug Expenditures: An Analysis of Divergent Approaches. Roche Laboratories, 1978.

Task Force on Prescription Drugs. Final Report. United States Department of Health, Education, and Welfare. Washington, D.C., United States Government Printing Office, 1969.

Trapnell, Gordon R. On Measuring the Effect of State Reimbursement Policy on Medicaid Spending for Prescription Drugs. In Mitchell, Samuel A.; and Emery A. Link, Editors. Impact of Public Policy on Drug Innovation and Pricing, Proceedings of the Third Seminar on Pharmaceutical Public Policy Issues, December 1975. Washington, D.C., American University, 1976. Pages 195-222.

Trapnell, Gordon R. "Estimated Cost of Implementing the Regulations Limiting Payment under Federal Health Programs to Maximum Allowable Costs (MAC's) and Estimated Acquisition Costs (EAC's)," unpublished, November 21, 1975.

U.S. Department of Health, Education and Welfare. "Inflation Impact Statement on CFR Title 45, Subtitle A, Part 19--Limits on Payment or Reimbursement of Drugs," July 25, 1975.

Warner Chilcott Company. "Guidelines for the Determination of MAC Administrative Costing Estimates," Morris Plains, N.J., 1975.

Wolfe, Harvey. "How Cost-Effective are Generics?," Hospitals 47 (9):100, 104, 106, 108, May 1, 1973.

Wonnacott, Ronald J. and Thomas H. Wonnacott. Econometrics. John Wiley and Sons, Inc., 1970.

APPENDIX A

REVIEW OF MAC-EAC EVALUATION LITERATURE

Appendix A

REVIEW OF MAC-EAC EVALUATION LITERATURE

Our purpose here is to review and synthesize literature relevant to benefit-cost evaluation of the MAC-EAC program.¹ The reader is forewarned, however, that the substantive literature on the MAC program is fairly sparse and not particularly helpful to the present evaluation effort, except in suggesting evaluation issues. Almost all of the interest to date has focused on the pecuniary cost-savings potential of the MAC-EAC program: how much money can be saved and at what cost? It should perhaps also be noted that much of the literature was developed in an adversarial context and tends to be somewhat less than even-handed.

The Cost-Savings Potential of the MAC-EAC Program

Although the concept of a MAC program had been around for years, the HEW Task Force on Prescription Drugs (1969) recommended it once again after noting wide variation in manufacturer list prices on multisource drugs. The Task Force estimated that a five to eight percent savings on drug expenditures for the elderly could result from a generic prescription program. However, it acknowledged that listed prices were potentially misleading, that they ". . . serve merely as an umbrella beneath which actual prices are set by quantity discounts, hospital discounts, government discounts, two-for-the-price-of-one deals, rebates and other special arrangements." Nevertheless, early estimates for the cost-savings to be achieved by the MAC portion of the MAC-EAC program were largely based upon the differentials in published prices. Although the Health Care Financing Administration (HCFA) is now obtaining information under contract with IMS America on invoice level prices in 1,000 pharmacies, such data have not been used by HCFA to

¹ See also Jean Paul Gagnon and Raymond Jang (1979) and Drug Product Selection, a Staff Report to the Federal Trade Commission (1979).

re-estimate the potential savings.¹ However, this was apparently done in an undocumented study conducted by IMS America for the Pharmaceutical Manufacturers Association (see IMS, 1974). Although their results indicate some downward revision of the estimated cost-savings, it was nevertheless still apparent that substantial price differences persist at the invoice level.²

Only a few substantive studies bore upon the potential cost savings to be achieved by the EAC provision. The Task Force on Prescription Drugs (1969) had estimated that average wholesale prices--then used by most Medicaid drug programs as the basis for ingredient cost--overstated actual acquisition cost by an average of 15 to 18 percent. More recently, Joseph G. Norwood et al. (1977) reported that the mean differential between average wholesale price (AWP) and actual acquisition cost (AAC) was \$0.56 per prescription, or 17.5 percent of the mean acquisition cost. However, they also find that the magnitude of the differential varies directly with pharmacy volume and conclude that a drug program establishing uniform prices

¹ It is, however, being used to assess the desirability of setting individual MACs.

² Several studies (e.g., Richard A. Horvitz et al., 1975 and Ashok K. Gumbhir and Christopher A. Rodowskas, 1974) purport to investigate actual consumer price differentials between generic and brand name prescriptions, and find less consistent evidence for cost savings. However, such finding is largely a "red herring" since generic prescriptions are often filled by the more expensive brand name products, or at least are not filled by the lowest-price generic equivalent that is widely and consistently available. On the other hand, Harvey Wolfe (1973) found that purchasing of the lowest-price generic equivalents would save only 3.5 percent of the total drug cost in hospitals. While we believe that Wolfe has underestimated the potential cost-savings, inasmuch as he takes the list price for the lowest-priced generic equivalent, his general finding that the cost-savings potential in hospitals is not large is probably correct. This happens because hospitals purchase brand name drugs at substantially lower than list price. It is unlikely that similarly large discounts would be available on the lower-priced generic equivalents. However, it should also be noted that multi-source drugs accounted for only 17 percent of total hospital drug costs in Wolfe's study. No doubt this figure is much higher now, due to patent expiration (see Table 2-2), and will continue to rise in the near future.

prices for reimbursement discriminates against smaller pharmacies. Other studies have likewise found systematic variation in actual dispensing costs. For example, the 1977 fee study in California found dispensing costs to range from \$1.00 per prescription to more than \$5.00 (Harris and Donnally, p. 32).¹

The Inflation Impact Statement and the Trapnell Study

Prior to actual implementation of the MAC/EAC program, two major evaluations of the prospective benefits and costs were conducted, the Inflation Impact Statement prepared by the federal government and the Trapnell study prepared for the pharmaceutical industry. Both studies focus almost exclusively on the pecuniary cost-savings potential.

The Inflation Impact Statement (1975) estimated that, if MACs had been in force for the 32 most common of the 55 multisource drugs, the savings in drug cost would have been \$37.2 million in fiscal year 1975.² It was likewise estimated in the Statement that the EAC provision of the MAC program would have saved from \$23.1 to \$38.4 million in fiscal 1975. Federal administrative costs were put at \$1.4 million; state administrative costs were estimated to be \$3.5 million in the first year and \$0.3 million annually thereafter. The total net savings was projected to range between \$55.3 and \$70.8 million (see Table A-1).

Gordon R. Trapnell (1975) conducted an independent evaluation of the prospective MAC program for Eli Lilly and Company and came up with an

¹ See Colman M. Herman and Edward J. Zabloski for a review of dispensing fee literature.

² The IMS study estimated that pharmacy acquisition costs for 33 multi-source drugs would be reduced by \$17 million per year, or 24 percent of the government outlay for these drugs.

Table A-1
 Estimated Savings and Costs, FY 1975 (in millions)

	Minimum Estimate	Maximum Estimate
Total Savings	\$60.2	\$75.6
<u>Federal Savings</u>		
MAC Program	22.7	22.7
EAC Program	<u>12.2</u>	<u>20.3</u>
Total Federal Savings	\$34.9	\$43.0
Less: Federal Administrative Costs	<u>1.4</u>	<u>1.4</u>
Net Federal Savings	\$33.5	\$41.6
<u>State Savings</u>		
MAC Program	14.5	14.5
EAC Program	<u>10.9</u>	<u>18.1</u>
Total State Savings	\$25.3	\$32.6
Less: Administrative Savings	<u>3.5*</u>	<u>3.5*</u>
Net State Savings	\$21.8	\$29.1
Total Net Savings	\$55.3	\$70.8

*This is a figure for the first year. After the initial costs have been incurred, State administrative costs decline to \$300,000 per year.

Source: Inflation Impact Statement, 1975.

altogether different assessment. In fact, Trapnell concluded that the MAC portion of the MAC-EAC program would actually increase costs (see Table A-2). However, consider the differences in methodology. First, Trapnell's estimate for the percentage savings was developed from IMS invoice data on just eight frequently prescribed multi-source drugs. Even if the sample were representative, and we have no reason to suggest otherwise, the error of estimate for the percentage savings figure would be very high because of the small sample size. That is, the estimated cost savings would be unreliable. However, perhaps more importantly, Trapnell used an extremely conservative criterion in projecting the MAC price levels. In particular, Trapnell assumed that the less expensive generic alternative must have at least 25 percent of the market, unless the price differential is small. Current experience with the MAC program suggests that this restriction is inappropriate. Trapnell also made several ad hoc and questionable assumptions that reduce the savings estimate to 67 percent of the price spread (e.g., a significant supply shortage is judged to occur with respect to reserpine and the savings estimate is reduced by one-third). Finally, Trapnell assumed that 37 percent of physicians would certify brand necessary, and the cost savings estimate was reduced accordingly. This assumption is also not supported by the program experience to date. We conclude that Trapnell's estimate for the cost savings--the reduction in benefit payment on line 1 in Table A-2--is biased downwards considerably and that, on balance, the Inflation Impact Statement gives a better "ballpark" estimate for the potential cost savings. Nevertheless, it must also be conceded that the Impact Statement overstated the cost savings potential for a variety of reasons: (1) the cost savings estimates were based upon the differentials in list price; (2) the study does not take account of states already having MAC programs--

Table A-2

Estimated Impact of the MAC Program on Net Federal and State Spending
(Millions of 1975 Dollars)

	1976	1977	1978	1979	1980	1981
1. Reductions in benefit payments under service programs*	\$ 0	\$ -9.2	\$-10.4	\$-13.0	\$-14.7	\$-16.6
2. Reduction in Federal and state income taxes*	0	+3.9	+4.4	+5.5	+6.2	+7.0
3. Administrative costs of the MAC program	+1.0	+2.0	+2.2	+2.4	+2.7	+3.0
4. Regulatory costs associated with the MAC program	+4.4	+5.0	+5.5	+6.0	+6.5	+7.0
5. Increase in costs of state administration of Medicaid	+ .3	+ .5	+ .5	+ .5	+ .5	+ .5
6. Increase in Federal agency administrative expenses	0	+ .7	+ .7	+ .7	+ .7	+ .7
	\$ +5.7	\$ +2.9	\$ +2.9	\$ +2.1	\$ +1.9	\$ +1.6

*Income to manufacturers is estimated to be reduced by the net of lines 1 and 2.

Source: Gordon Trapnell, 1975.

states accounting for about 20 percent of all Medicaid expenditures; (3) there is no allowance for physician "override", or brand necessary certification; and (4) some of the multisource drugs had potential bioequivalency problems.

Consider now the other costs that Trapnell attributes to the MAC program. First, Trapnell assumes that the reduction in drug expenditure is offset by a 42 percent loss of tax income to federal, state, and local governments. This assumes that the entire expenditure reduction comes from profit. However, even if Trapnell's estimate for the tax loss were correct, it is not a cost that should be attributed to the program. Taxes are merely transfer payments within the society at large and do not represent a real cost from the taxpayers' perspective.¹ Second, Trapnell indicates higher estimates for the cost of administering the MAC program (see lines 3, 4, and 6 of Table A-2). Nevertheless, the difference between Trapnell's estimate and the one given by the Inflation Impact Statement was not so large as to dominate the overall evaluation.² Third, Trapnell estimated that the MAC program would entail \$4.4 million in added costs to the FDA for bioequivalence testing and quality assurance in 1976 and somewhat larger cost increments in subsequent years. The Inflation Impact Statement maintains that these activities would have been undertaken anyway and therefore do not represent a cost to the MAC program.

Trapnell also evaluates the EAC provision of the MAC program (see Table A-3). He basically assumes that there is no money to be saved. In

¹ See E. J. Mishan (1971).

² The Warner Chillicott Company (1975) also developed estimates of MAC program administrative costs; however, these estimates pertained to the initially planned actual acquisition cost (AAC) program and are not relevant to the finally promulgated EAC-type program.

Table A-3

Estimated Impact of the EAC Program on Net Federal and State Spending
(Millions of 1975 Dollars)

	1976	1977	1978	1979	1980	1981
1. Reductions in outlays for acquisition costs+	\$-12.0	\$-52.0	\$-81.0	\$-114.0	\$-119.0	\$-125.0
2. Increase in dispensing fees*	+6.0	+32.0	+64.0	+100.0	+117.0	+129.0
3. Additional state adminis- tration expense to set EAC's and dispensing fees	+6.4	+5.7	+5.7	+5.7	+5.7	+5.7
4. Increase in administrative expenses related to claim processing	+ .8	+ .2	+ .2	+ .2	+ .2	+ .2
5. Federal administrative expenses for the EAC program	+ .6	+ .7	+ .7	+ .8	+ .8	+ .9
	\$ +1.8	\$-13.4	\$-10.4	\$ -7.3	\$ +4.7	\$+10.8

*Income to pharmacies is estimated to be reduced by the net of lines 1 and 2.

Source: Gordon Trapnell, 1975.

other words, he argues that pre-EAC price levels fairly reflect the costs of doing business and that, in the short run, losses of income due to EAC will simply be passed on to the general public in the form of higher prices for non-Medicaid prescriptions. However, in the long run (five years), Trapnell assumes that pharmacies will organize and renegotiate the earlier price levels for Medicaid reimbursement. On the other hand, the Inflation Impact Statement assumes that any dispensing fee changes due to the mandated cost studies ". . . are the result of improved information and more rational fee setting by State authorities and are not properly attributable to the MAC program per se." (p.24) This is not correct. If dispensing fee levels can be shown to increase in response to reduced reimbursement for ingredient cost, it is a cost properly charged to the program.¹ Even so, the Inflation Impact Statement itself indicates considerable uncertainty about the level of cost savings to be achieved by EAC, giving both minimum and maximum estimates.²

The Mini-MAC Studies

Several studies of state "mini-MAC" programs are also germane. Consider first Eli Lilly and Company's 1977 analysis of California's MAIC program. This study gave some evidence that MAC-type regulations act as both a floor under and a ceiling above prices, that manufacturers tend to raise

¹ Robert L. Harris and Bernard P. Donnelly (1977, p. 24) report that the California Department of Health "... increased the fee on March 6, 1977 from \$2.86 to \$3.08 per prescription, an amount calculated to offset the loss to pharmacies arising from imposition of EAC controls on that data." Furthermore, as reported in Gagnon and Jang (date p. 58), the frequency and average size of dispensing fee increases have both increased twofold since implementation of the MAC program.

² It is arbitrarily assumed that the cost of ingredient cost will be reduced by at least 9 to 15 percent since the Task Force on Prescription Drugs found that the average overstatement from AWP is from 15 to 18 percent.

prices to the MAC level.¹ However, the finding most touted in the Lilly study was that California and Tennessee--the two states best known for their mini-MAC programs--have experienced more growth in drug expenditure per eligible than have Texas and Indiana--two states without MAC-type programs. It was further shown that increased utilization and eligibility account for 78 percent of the growth in California's total drug expenditure under Medi-Cal. The Lilly study thereupon concludes that:

- (1) MAC-type regulations have proven ineffective in achieving their objective to lower drug costs.
- (2) Even if HEW's estimated savings for MAC materialized . . . , these savings could represent an insignificant financial benefit in the face of potential financial problems in other parts of the Medicaid program not even touched by the MAC regulations. (p. 12)

While the weight of evidence given supports both statements, the statements are also potentially misleading. The purpose of a MAC program is to contain the per-unit cost of drugs, and indeed the Lilly study finds that the cost per unit of medication increased only 4.5 percentage points under California's MAIC program. However, the cost savings resulting from pricing restraint was overwhelmed by cost increases over time due to increased utilization. Inasmuch as MAC-type programs were never designed to contain utilization, we must conclude that cost increases would have been even greater in the absence of the MAIC program. Furthermore, the fact that the Medicaid program also confronts other financial problems does not in any way affect evaluation of the MAC program per se. It merely suggests that MAC can

¹Harris and Donnelly (p. 45) similarly suggest that California pharmacies with large Medicaid sales tend to raise their "usual and customary" or general retail prices to the Medicaid ceilings. However, the evidence presented by them is not persuasive. It does not preclude alternative explanations (e.g., the Medicaid pharmacies may be inherently more expensive).

not be relied upon as the only mechanism for drug cost containment and that, for example, utilization controls are also important.

The following are indicated as conclusions elsewhere in the Lilly study:

". . . MAC--where tried in various states--has failed to control cost increases in Medicaid drug programs." (p. 2)

"It has been shown that MAC price constraints can reduce the effectiveness of the pharmaceutical industry and retail pharmacy." (p. 31)

No evidence was given to support these assertions.

Stephen G. Sudovar, Jr. and Susan D. Rein (1978) conducted a more extensive analysis of cost differences between the Medicaid drug programs in California and Texas. Their study for Roche Laboratories found that the ingredient cost per claim was 8.0 percent lower in California than in Texas--\$3.68 and \$4.00, respectively. However, Sudovar and Rein note that this cost differential was not necessarily due to California's MAIC program, that their study had not controlled for prescription size, and that California's more restrictive formulary limits the use of some widely used but more expensive drugs. Sudovar and Rein also observe that the professional fee in California was \$0.17 higher than that in Texas--\$2.13 vs. \$1.96. While the higher professional fee partly offsets the ingredient cost savings, it was not shown that the two were causally related. The fee difference could, for example, simply reflect underlying differences between the two states in the cost of doing business. Sudovar and Rein likewise note that the drug utilization rate was higher in California, and they estimate that the administrative costs in California were \$0.17 higher per claim--\$0.46 vs. \$0.29. Thus, on balance, it was found that the California drug program is more expensive per recipient than the Texas program, and Sudovar and Rein conclude as follows:

. . . it can reasonably be stated that the original hypothesis [that more stringent regulatory controls will result in reduced costs] is tenuous at best. Implementation of complex regulatory programs intended to control access to drugs and/or drug prices does not necessarily lead to lower overall drug program expenditures. (p. 15)

This is much the same as the conclusion from the Lilly study and can be as easily misconstrued. It does not say that drug program costs would have been less without MAIC and other controls in California; nor does it say that the cost would not have been greater in the absence of these controls. Even so, the entire conclusion rests on the questionable assumption that the drug utilization rate is higher in California due to that state's more stringent regulatory controls. California actually had a lower cost per claim—\$5.71 vs. \$5.96—a more relevant criterion for ascertaining the cost savings due to the MAIC program, inasmuch as the program was not meant to control utilization.

The Sudovar and Rein study raises questions that could not be reliably answered from "case study" comparison of just a few states. Because of the extreme heterogeneity of state drug programs, reliable inference from state-to-state differences depends upon having a large sample of states and/or controlling more fully for the relevant differences between states.¹

The Tennessee Medicaid program has conducted periodic studies of its mini-MAC program, and in 1975-1976 projected reimbursement savings in excess of \$800,000. The study did not estimate the administrative costs. However the costs of bioavailability testing were \$130,000 per year.

¹This is so much a problem in the present study, inasmuch as inference rests largely upon the pattern of changes over time within the same state.

The Meager Evidence for Other Hypotheses

It was also widely agreed that the MAC program may have certain indirect effects that either cannot be easily predicted or, if predictable, could not be easily valued for benefit-cost purposes. The following were noted as potential indirect effects in the Inflation Impact Statement:

- physicians may begin prescribing the lower-priced generics for all patients, not just for their Medicare and Medicaid patients;
- MAC may lead to a reduction in drug research and development;
- the price advantage gained by larger discounts due to larger volume purchasing would be neutralized by EAC--e.g., smaller pharmacies would receive relatively greater reimbursement for ingredient cost;
- pharmacies may have to maintain a larger inventory; and
- "call backs" for physician authorization to substitute will be required in states having anti-substitution legislation.

None of these prospects is actually explored in the Inflation Impact Statement.

Trapnell and others note further areas of potential impact that may affect evaluation of the program:

- price increases on non-Medicaid prescriptions;
- price increases on single-source drugs;
- non-participation by pharmacists (i.e., refusal to accept Medicaid reimbursement);
- pharmacy losses on Medicaid prescriptions;¹
- reduction in pharmacy services (e.g., free delivery or drug counseling);
- pharmacy closings; and
- increased health risk due to lack of bioequivalence or to poor quality control in the manufacturing of lower-priced generics.

¹Vince Gardner, former director of the MAC program, was among those expressing concern that pharmacist fees would be unfairly limited by state fiscal constraints.

As noted in Section 2, the bioequivalence/quality issue received considerable attention at the time of MAC program inception. However, over the last several years, the industry argument has lost much of its merit, because of the entry by major companies into the generic market and the FDA's development of new Good Manufacturing Practice (GMP) requirements and bioavailability regulations.

More recently, product availability has emerged as a consideration that might affect evaluation of the MAC program. For example, a MAC reimbursement limit was set on chlordiazepoxide HCl at a level well below the price being charged by Roche for Librium, the brand name product, even though Roche's product represented 99 percent of the market. Roche unsuccessfully challenged PRB's contention that chlordiazepoxide HCl would be "widely and consistently available" at the MAC reimbursement limit.¹ Soon after promulgation of the initials MACs--between December 1977 and July 1978--Earle W. Lingle, Jr. and Jean Paul Gagnon (1978) audited a sample of 75 nonchain pharmacies in North Carolina and found that only 13.3 percent of the pharmacies had any 5 mg. chlordiazepoxide stock that had been acquired at or below the MAC reimbursement level. Availability of inventory at the MAC limits was somewhat less problematic for other chlordiazepoxide strengths and for other MAC products (see Table A-4). If such availability problems persist indefinitely, the presumptive equity and efficacy of the MAC program will be seriously undermined. The problem is probably less severe in states not having antisubstitution laws.²

¹ Large pharmaceutical manufacturers assured PRB that given 60 days lead time, they could satisfy the market requirements.

² Availability problems were more recently reported in a study by Pracon Incorporated, prepared for the National Wholesale Druggist's Association and Smith Kline and French Laboratories.

Table A-4

Breakdown of Pharmacies with at Least One Stock
Bottle in Inventory at or Below MAC Levels

Drug Product	Number of Pharmacies (n=75)	Relative Frequency
Ampicillin 250mg	60	80.0
Ampicillin 500mg	59	78.7
Penicillin VK 250mg	41	54.7
Penicillin VK 500mg	34	45.3
Penicillin VK 125mg/5ml	49	65.3
Penicillin VK 250mg/5ml	50	66.7
Tetracycline 250mg	62	82.7
Tetracycline 500mg	34	45.3
Propoxyphene 65mg	24	32.0
Propoxyphene 65mg w/APC	17	22.7
Chlordiazepoxide 5mg	10	13.3
Chlordiazepoxide 10mg	19	25.3
Chlordiazepoxide 25mg	15	20.0

Source: Earle W. Lingle, Jr. and Jean Paul Gagnon,
1978.

Only a few previous studies bear directly on other MAC-impact hypotheses. Dickens and Hogan (1977) analyze the pattern of drug price increases during the 1970s and find no indication that the higher rates of price increase since 1974 were due to the MAC program. Paul Dickens (1976) gave brief theoretic attention to the likely effect on industry research and development activities. Dickens considers three alternative models and reports that each suggests a different conclusion. One model indicates an adverse effect, another suggests little effect, and the third implies that MAC gives an impetus to greater R & D effort. Dickens thereupon concludes that the effect can only be determined empirically. Drug Product Selection, a Staff Report to the Federal Trade Commission, summarizes three unpublished economic studies commissioned by the FTC to investigate the potential effects of generic prescribing on new drug innovation. The FTC study concludes that "The three analyses we obtained indicate that some negative impact upon R&D might result from removal of these laws, but only one concluded that the impact would significantly lower the industry's expected rate of return on R&D" (p. 231).

APPENDIX B

SURVEY INSTRUMENT

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

As part of the overall effort to design and implement an evaluation of the maximum allowable cost (MAC) program, it is first necessary to collect selected information on state Medicaid drug benefit programs. To the extent possible, this information will be abstracted from secondary data sources available to the federal government. The next page indicates the data format to be used to abstract this information. Following that is the instrument to be used in interviewing state Medicaid pharmacy consultants. It gathers that information not available from federal sources. The instrument begins with a statement explaining the nature of the project and the kinds of information sought. It then moves to the specific questions. Complete directions are given for administering the instrument.

DATA SHEETS ON MEDICAID DRUG BENEFIT PROGRAMS

(Federally Available Information)

STATE _____

PROGRAM INITIATED / /
DRUG PROGRAM INITIATED / /

	1974	1975	Fiscal Year 1976	1977	1978
<u>MEDICAID BENEFIT PAYMENTS</u>					
Total Program					
• Drug Program (Outpatient Only)					
NUMBER OF PRESCRIPTIONS					
ANNUAL NUMBER OF UNDUPLICATED RECIPIENTS					
MEDICAID ADMINISTRATIVE COSTS (TOTAL)					
<u>ELIGIBILITY FOR DRUG COVERAGE</u>					
yes	no	yes	no	yes	no
• Categorically Needy	<input type="checkbox"/>				
• Medically Needy	<input type="checkbox"/>				
• Other (Specify): _____	<input type="checkbox"/>				
<u>MAJOR CHANGES IN ELIGIBILITY (Please Describe)</u>					

HHS STATUS: CURRENT STATUS _____

DATE OF CERTIFICATION / /

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

INSTRUCTIONS TO INTERVIEWER

Each interviewer will be provided with the names and telephone number of the pharmacy consultants to talk with. In those cases, when the person listed is no longer in that position, it is, of course, appropriate to determine who the current consultant is and to interview him or her. If the person to be contacted is not available at the time of the call, please schedule a firm date and time to carry out the interview. If a pharmacy consultant will not cooperate, simply thank him or her and proceed to the next person on the list. You should, however, report all such instances to the person in charge of the survey.

This survey instrument provides you with complete information on how the interview should be conducted. All instructions to you are in all capital letters and placed in parentheses. The questions themselves are written for ease of delivery and to maintain a continuous flow during the interview. You should understand that in many cases the questions are historical in nature and that data are being gathered for a five-year period. Each year must be covered for each question. Often, however, there will not have been any changes from year-to-year. This should make the interview proceed more quickly than might otherwise be apparent. Nevertheless, be sure to cover all five years.

In those cases where the respondent does not know the answer, but refers to a document, make a note and request the document at the end of the interview. If the respondent does not know the answer to a specific question, but refers you to another person, you are to get the telephone number and complete the interview by contacting that person. The pharmacy consultant's referral should be used in introducing yourself to this second respondent.

The interview begins with a brief introductory statement that may be found on the next page. This statement should be read to each respondent.

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

INTRODUCTORY STATEMENT

(THE FOLLOWING STATEMENT SHOULD BE USED TO BEGIN THE INTERVIEW.)

Hello, I'm _____ with Pracon Incorporated, a health care consulting firm in Washington, D. C. We are working with Abt Associates and the Office of Research in the Health Care Financing Administration, DHEW, on an evaluation of the MAC program. The purpose of this call is to gather specific information on your drug benefit program. We are interested in the current configuration of the program, as well as the operation of the program over the last five (5) years.

We are compiling these data on all state programs. The information will be used for several purposes:

- To prepare a comprehensive profile of MAC and EAC in the states;
- To provide a data base for the economic analysis of the program, examining Medicaid drug benefit programs before and after the implementation of MAC; and
- To assist the evaluation study group in the selection of states for further in-depth analysis.

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

We expect the interview to take between 30 and 45 minutes. Can we do the interview now or may I schedule a more convenient time to talk with you.

(INTERVIEWER SHOULD ENTER THE TIME AND DATE HERE: _____.)

(IF THE INTERVIEWEE INDICATES HE OR SHE IS READY NOW, PROCEED TO THE NEXT PARAGRAPH.)

Before beginning, I should note that the completed interview form will be sent to you so that you may check it for accuracy and add information that you may not have immediately available. In addition, we will prepare a summary of the results from all the states and send this to you.

(INTERVIEWER SHOULD NOW TURN TO THE NEXT PAGE AND BEGIN THE QUESTIONS.)

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State _____ Date _____ / _____ / _____

	Fiscal Year			
	1974	1975	1976	1977

<u>REIMBURSEMENT FOR PRESCRIPTION DRUGS</u>	<u>Ingredient Cost/EAC Method</u>	<u>YES</u>	<u>NO</u>								
a.. AWP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.. AWP Prices Less Discount	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.. Wholesaler Supplied Prices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.. Direct Prices - Selected Products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.. Quantity Prices - Selected Products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f.. Federal Decile Prices				<input type="checkbox"/>							
g.. Other (please describe)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							<input type="checkbox"/>	<input type="checkbox"/>

- Interviewer: I would first like to ask about the method your program has used and now uses for setting reimbursement rates for drugs, both before and since the EAC regulations.
1. During (NAME EACH YEAR IN SEQUENCE) did the program use (READ LIST AND CHECK 'YES' OR 'NO' FOR EACH ITEM):

- | | | | | | | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a.. AWP | <input type="checkbox"/> |
| b.. AWP Prices Less Discount | <input type="checkbox"/> |
| c.. Wholesaler Supplied Prices | <input type="checkbox"/> |
| d.. Direct Prices - Selected Products | <input type="checkbox"/> |
| e.. Quantity Prices - Selected Products | <input type="checkbox"/> |
| f.. Federal Decile Prices | | | | <input type="checkbox"/> |
| g.. Other (please describe) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | <input type="checkbox"/> | <input type="checkbox"/> |
- What Decile Used?

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

Dispensing Fee

- Were there or are there exceptions to the method used? Could you describe those exceptions year-by-year?

Dispensing Fee

Interviewer: Next, I would like to cover the dispensing fee used by your program. (ASK 3 AND 4 AS A UNIT FOR EACH YEAR)

3. Can You tell me what the dispensing fee was/is for (NAME EACH YEAR IN SEQUENCE)?

	Fiscal Year			
	1974	1975	1976	1977
\$	\$	\$	\$	\$
YES	NO	YES	NO	YES
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a... A flat fee for all prescriptions?				
b... A variable fee for level of services provided? (IF YES, ASK FOR A COMPLETE DESCRIPTION OF THE DIFFERENT FEES AND ENTER.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c... A percentage mark-up? (IF YES, ASK FOR THE PERCENTAGE AND ENTER.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d...	<hr/>	<hr/>	<hr/>	<hr/>

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

	State _____		Date ____ / ____ / ____	
	Fiscal Year			
	1974	1975	1976	1977
Other Restrictions				
5. Interviewer: During (YEAR) are/were there other restrictions on the amount paid for prescription drugs, such as the lesser of usual and customary charges or calculated prices? (IF YES, ASK) Could you describe those other restrictions?	YES <input type="checkbox"/>	NO <input type="checkbox"/>	YES <input type="checkbox"/>	NO <input type="checkbox"/>
6. Could you tell me the date that the federal MAC program was implemented in your state?				
7. Before the federal MAC came into being, did your state have its own maximum allowable cost program?	YES <input type="checkbox"/>	NO <input type="checkbox"/>		
8. When was the program implemented?				
9. Could you tell me what products were covered year-by-year? (IF THE LIST IS EXTENSIVE, ASK IF A COPY OF THE LIST IS AVAILABLE FOR THE APPROPRIATE YEARS AND WOULD HE OR SHE SEND IT TO YOU.)				

MAC Program

5. Interviewer: I would now like to find out about the MAC program in your state.
6. Could you tell me the date that the federal MAC program was implemented in your state?
7. Before the federal MAC came into being, did your state have its own maximum allowable cost program?
8. When was the program implemented?
9. Could you tell me what products were covered year-by-year? (IF THE LIST IS EXTENSIVE, ASK IF A COPY OF THE LIST IS AVAILABLE FOR THE APPROPRIATE YEARS AND WOULD HE OR SHE SEND IT TO YOU.)

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State _____

Date 1 / 1

YES NO

10. Has your state repealed its anti-substitution legislation?

11. What was (is) the effective date of the repeal? _____

12. What kind of substitution regulation is currently in force? (READ LIST AND CHECK YES OR NO FOR EACH CATEGORY.)

a... Positive formulary-listing of drugs which the pharmacist may substitute.

b... Negative formulary-listing of drugs which pharmacist may not substitute.

c... Physician approval of substitution requested.

d... Substitution allowed unless physician forbids it.

e... Other (PLEASE DESCRIBE):

- Did your state have an anti-substitution law after MAC was implemented? (IF NO, SKIP TO QUESTION 15.)

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

	State _____		Date _____ / _____ / _____	
	Fiscal Year			
	1974	1975	1976	1977

14. Can you describe the administrative mechanism that allows or allowed pharmacy substitution under MAC without physician authorization?

	YES	NO	YES	NO	YES	NO
	<input type="checkbox"/>					

15. Are there data available on the number of physician overrides of MAC products in (YEAR) ?

Other Payment Limitation

Interviewer: I would now like to ask you about several other kinds of payment limitations that you may have in your drug program.

16. Dollar Limits (ASK A-C AS A UNIT BY YEAR)

	YES	NO	YES	NO	YES	NO	YES	NO
	<input type="checkbox"/>							

a.. During (YEAR) were/are there dollar limits on the amount that can be spent on prescription drugs per month? (IF YES, ASK B AND C BEFORE GOING TO NEXT YEAR. IF NO, PROCEED TO QUESTION 17)

- b.. When was this implemented?
c.. What was, and is, the dollar limit?

\$ _____	\$ _____
----------	----------

\$ _____

\$ _____

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State _____
Date ____ / ____ / ____

	Fiscal Year				
	1974	1975	1976	1977	1978

Limits on Size of Prescriptions

- 17.. Are there or have there been limits
on the size of prescriptions based on
drug therapy? (IF NO, PROCEED TO NEXT
SET OF QUESTIONS, "COPAYMENTS".)
- 18.. When were these implemented? (ENTER DATE)
Are they still in force? (IF NOT, ENTER DATE)
.. Could you describe the limits? (IF THIS LIST
IS EXTENSIVE, ASK FOR A COPY OF THE CONTROLS
COVERING THE APPROPRIATE YEARS.)

Copayments

- 20.. Does, or did, your program have a co-
payment for drugs? (IF NO, PROCEED TO
NEXT SET OF QUESTIONS, "FORMULARY".)

- 21.. When was this implemented? (ENTER DATE)
Are they still in force? (IF NOT, ENTER DATE)
22.. What was, and is, the copayment amount?
\$ _____

Formulary

- 23.. Did your drug program have a formulary
in 1974, 1975, 1976, 1977, and does it
have one now? (IF NO FOR ALL YEARS,
PROCEED TO QUESTION 27)
- 24.. When was the formulary implemented?
____ / ____ / ____

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

	Fiscal Year				State _____	Date _____ / _____ / _____
	1974	1975	1976	1977		
25.. Approximate how many drug items are on the formulary?	_____	_____	_____	_____	_____	_____
26.. Could you describe the nature of the formulary? (CHECK ONE)	YES	NO	YES	NO	YES	NO
a - Open?	<input type="checkbox"/>					
b - Closed?	<input type="checkbox"/>					
c - Other Comments?						

Limit on Number of Prescriptions Per Month

- 27.. Were there or are there limits on the number of prescriptions a beneficiary may have in a month? (IF NO, PROCEED TO THE "PRIOR AUTHORIZATION" QUESTIONS.)
- 28.. When were these limits implemented? (ENTER DATE) Are they still in force? (IF NOT, ENTER DATE.)
- 29.. What was (is) the limit?
- 30.. What were (are) the exceptions to this limit?

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State _____
Date ____/____/____

	Fiscal Year				
	1974	1975	1976	1977	1978

Prior Authorization

31.. Did (does) the program require prior authorization for drugs under certain circumstances?

| | YES | NO |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> |

32.. When was prior authorization implemented? (ENTER DATE) Are these still in effect? (IF NOT, ENTER END DATE)
33.. When was (is) prior authorization applicable? (CHECK ONE OR MORE.)

	Began	End
	____/____/____	____/____/____
a - Drugs not on the formulary?	<input type="checkbox"/>	<input type="checkbox"/>
b - When dollar limit is exceeded?	<input type="checkbox"/>	<input type="checkbox"/>
c - When number of prescriptions exceeded?	<input type="checkbox"/>	<input type="checkbox"/>
d - Other? (Please describe)	<input type="checkbox"/>	<input type="checkbox"/>

34.. Who is responsible for approving authorization requests?

DRUG PROGRAM ADMINISTRATIVE COSTS	SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS		Fiscal Year	State _____	Date _____ / _____ / _____	
	1974	1975	1976	1977	1978	

Interviewer: I would now like to ask you about the costs of administering the benefit program.

35. First, is it possible to identify separately the administrative costs of the drug program?
36. If so, what are those costs per year?
37. Has there been, or is there now, a fiscal agent for the drug benefit program?
38. Who was (is) the fiscal agent?
39. What was the amount of the contract with the fiscal agent?

PHARMACY PARTICIPATION

Interviewer: I have two questions I'd like to ask about pharmacy participation.

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State _____ Date / /

Interviewer: I would like to ask you several questions about the data you have available on the drug program for the years 1974 through 1978.

- (ASK 40-42 AS A UNIT FOR EACH YEAR.)

40. During (YEAR) how many pharmacies participated in the program?

41. Can you give us the yearly average?

42. What was/is the total number of pharmacies in the state in (YEAR)?

DATA AVAILABILITY

Interviewer: I would like to ask you several questions about the data you have available on the drug program for the year 1974 through 1978.

43. Does the program prepare a "Drug Usage Frequency Analysis" that lists number of Rx's and \$ expenditures by individual products grouped by therapeutic categories (similar to Output No. MR-0-21 in MARS)?

44. If yes, is the report available:

 - Annually?
 - Quarterly?
 - Monthly?

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

	Fiscal Year					State _____	Date _____	
	1974	1975	1976	1977	1978			
45. Do you know what the storage medium is:	YES	NO	YES	NO	YES	NO	YES	NO
a.. Paper?	<input type="checkbox"/>							
b.. Micro-film or Fiche?	<input type="checkbox"/>							
c.. Other (Please specify)?								
46. Are claims data available?	<input type="checkbox"/>							
47. Have there been changes in product codes?	<input type="checkbox"/>							
a.. If so, could you describe the changes? (THE INTERVIEWER SHOULD NOTE BOTH THE OLD AND NEW CODES AND THE DATES OF THE CHANGES.)								

OTHER INFORMATION

(THE INTERVIEWER WILL THEN ASK SEVERAL QUESTIONS
ABOUT PROGRAM FORMS.)

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State _____

Date / /

- Interviewer: Could you please send a copy of: YES NO
48. Drug claim form?
49. Sample of Drug Usage Frequency Analysis Report?
50. General information on the program that is forwarded to participating pharmacies?
51. Could you also send me the reports/other documentation you mentioned earlier in the interview. (THIS WILL INCLUDE SUCH THINGS AS A LIST OF DRUGS COVERED UNDER A STATE MAC, RULES AND REGULATIONS, OR STUDIES ON THE PROGRAM. THE INTERVIEWER SHOULD BRIEFLY REVIEW THE INSTRUMENT TO CHECK FOR OTHER NEEDED DOCUMENTATION MENTIONED BY THE PHARMACY CONSULTANT.)

CLOSING

Interviewer: Thank you very much for your cooperation. As I suggested at the beginning of the interview, we will send you the completed form for your review. When you receive the form, we would greatly appreciate your answering those questions that were not available during the interview. I should also note that a summary of all the states will be developed, and

SURVEY OF STATE MEDICAID DRUG BENEFIT PROGRAMS

State _____
Date ____ / ____ / ____

we will send this to you. To make sure the information reaches you, may I have your current address and title. (INTERVIEWER WILL NOTE NAME, ADDRESS, AND TITLE IN THE FOLLOWING SPACE.)

Name _____
Title _____
Address _____

Again, thank you for your help.

APPENDIX C

	<u>Page</u>
State Medicaid Drug Program Reimbursement Methods 1974 through 1978	C-3
State Medicaid Drug Programs Restrictions 1974 through 1978	C-11
State Medicaid Drug Program Professional Fees 1974 through 1979	C-19
Status of Substitution Laws December 1978	C-27
Administration of Medicaid Drug Programs	C-31
Individual State Profiles	C-35

State Medicaid Drug Program Reimbursement Methods
1974 through 1978

Reimbursement Methods - 1974

	AMP	AMP LESS DISCOUNT	WHOLESELLER SUPPLIED	SELECTED PRODUCTS		FEDERAL DECILE			AAC	USUAL AND CUSTOMARY	OTHER
				DIRECT	QUANTITY	YES	NO	PERCENT			
Alabama			X				X		X		
Alaska	Only State-funded	drug program									
Arizona	No Medicaid Program										
Arkansas	X						X		X		
California	X						X		X	State MAC	
Colorado	X						X		X	State MAC	
Connecticut	X						X		X		
Delaware							X		X	X	
D.C.		X					X				
Florida	X						X			X	
Georgia		X					X			X	
Hawaii											
Idaho							X				pd. as billed
Illinois	X	X	X				X		X	X	State MAC
Indiana	X	X					X		X	X	
Iowa		X	X	X			X				
Kansas	X	X	X	X			X				
Kentucky	X	X	X	X			X				
Louisiana		X			X		X				
Maine	X	X					X				
Maryland	X		X	X			X				
Massachusetts	X						X			X	
Michigan	X	X	X				X		X	X	
Minnesota			X				X				
Mississippi	X	X					X			X	State MAC
Missouri	X		X	X			X			X	State MAC
Montana							X			X	
Nebraska		X					X				
Nevada	X	X					X				
New Hampshire	X						X				
New Jersey	X	X	X				X			X	
New Mexico	X		X				X			X	
New York	X						X				
North Carolina	X				X		X			X	
North Dakota			X				X				
Ohio	X						X			X	
Oklahoma											
Oregon	X		X	X	X		X			X	State MAC
Pennsylvania			X	X			X			X	
Rhode Island	X			X			X			X	State MAC
South Carolina	X		X				X				
South Dakota							X				
Tennessee							X			X	X
Texas	X						X			X	X
Utah			X				X			X	
Vermont	X				X		X				
Virginia			X	X	X		X				
Washington			X				X			X	State MAC
West Virginia	X						X				
Wisconsin		X	X	X	X		X			X	State MAC
Wyoming	No Medicaid	Drug Program									

Reimbursement Methods - 1975

	AMP	AMP LESS DISCOUNT	WHOLESALER SUPPLIED	SELECTED PRODUCTS		FEDERAL DECILE			AMC	USUAL AND CUSTOMARY	OTHER
				DIRECT	QUANTITY	YES	NO	PERCENT			
Alabama			X				X		X		
Alaska	Only	State funded	drug program								
Arizona	No Medicaid Program										
Arkansas	X						X		X		
California	X						X		X	State MAC	
Colorado	X	X					X		X	State MAC	
Connecticut	X						X		X		
Delaware							X		X	X	
D.C.		X					X				
Florida	X						X			X	
Georgia	X	X		X			X			X	
Hawaii											
Idaho							X				
Illinois	X	X		X			X		X	X	rd. as billed
Indiana	X	X					X		X	X	State MAC
Iowa		X	X	X			X			X	
Kansas	X	X	X	X			X			X	
Kentucky	X	X	X	X			X			X	State MAC
Louisiana		X		X			X			X	
Maine	X	X					X				
Maryland	X		X	X			X				
Massachusetts	X						X			X	
Michigan	X	X	X				X		X	X	
Minnesota			X				X			X	
Mississippi	X		X				X			X	State MAC
Missouri	X		X	X	X		X			X	State MAC
Montana							X			X	
Nebraska			X				X				
Nevada	X	X					X				
New Hampshire	X						X				
New Jersey	X	X	X				X			X	
New Mexico	X		X				X			X	
New York	X						X				
North Carolina	X				X		X			X	
North Dakota			X				X				
Ohio	X						X			X	
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X		X			X	State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	State MAC
South Carolina	X		X				X				
South Dakota	X		X				X			X	State MAC
Tennessee							X		X	X	State MAC
Texas	X						X		X	X	
Utah			X				X			X	
Vermont	X				X		X				
Virginia			X	X	X		X				
Washington			X				X			X	X
West Virginia	X		X	X	X		X				State MAC
Wisconsin		X	X	X	X		X			X	State MAC
Wyoming	No Medicaid Drug Program										

Reimbursement Methods - 1976

	AWP	AWP LESS DISCOUNT	WHOLESELLER SUPPLIED	SELECTED PRODUCTS		FEDERAL DECILE			AMC	USUAL AND CUSTOMARY	OTHER
				DIRECT	QUANTITY	YES	NO	PERCENT			
Alabama			X				X		X		
Alaska	Only State	funded drug program									
Arizona	No Medicaid Program										
Arkansas	X						X			X	State MAC
California	X						X			X	State MAC
Colorado	X	X					X			X	State MAC
Connecticut	X		X				X			X	
Delaware							X		X	X	
D.C.		X		X			X			X	
Florida	X						X			X	
Georgia	X	X		X			X			X	
Hawaii											
Idaho							X				Pd. as billed
Illinois	X	X		X	X			50%	X	X	State MAC
Indiana	X	X			X			< 70%	X	X	State MAC
Iowa		X	X	X			X			X	
Kansas	X	X	X	X			X			X	
Kentucky	X	X	X	X			X			X	State MAC
Louisiana		X		X			X			X	
Maine	X	X					X				
Maryland	X		X	X	X			70%	X		Lower EAC
Massachusetts	X						X			X	
Michigan	X	X	X				X			X	
Minnesota		X					X			X	
Mississippi					X			70%	X		State MAC
Missouri	X		X	X	X			< 70%	X		State MAC
Montana	X	X	X				X			X	
Nebraska	X						X				
Nevada		X		X			X			X	
New Hampshire	X		X				X			X	
New Jersey	X	X	X				X			X	
New Mexico	X		X	X	X		X			X	
New York	X		X	X	X	X		< 70%		X	
North Carolina	X				X		X			X	
North Dakota	X		X				X				
Ohio	X						X			X	
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X	X		70%	X		State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	State MAC
South Carolina	X	X	X			X		70%			
South Dakota	X		X				X			X	State MAC
Tennessee							X		X	X	State MAC
Texas	X			X			X		X	X	
Utah			X				X			X	State MAC
Vermont	X				X		X				
Virginia			X	X	X		X			X	
Washington			X				X			X	State MAC
West Virginia	X			X	X	X		X		X	
Wisconsin				X	X	X		X		X	State MAC
Wyoming		No Medicaid Drug Program									

Reimbursement Methods - 1977

	AMP	AMP LESS DISCOUNT	WHOLESELLER SUPPLIED	SELECTED PRODUCTS		FEDERAL DECILE			AMC	USUAL AND CUSTOMARY	OTHER
				DIRECT ^r	QUANTITY	YES	NO	PERCENT			
Alabama			X	X			X			X	
Alaska	Only State-funded drug program										
Arizona	No Medicaid Program										
Arkansas	X						X			X	State MAC
California	X			X	X		X			X	State MAC
Colorado	X		X				X			X	State MAC
Connecticut	X			X			X			X	
Delaware							X		X	X	
D.C.		X			X		X			X	
Florida		X			X		X			X	State MAC
Georgia	X	X		X			X			X	
Hawaii											
Idaho	X	X					X			X	
Illinois		X		X	X			50%	X	X	State MAC
Indiana						X		70%	X	X	
Iowa		X	X	X			X			X	
Kansas	X	X	X	X			X			X	
Kentucky	X	X	X	X			X			X	State MAC
Louisiana		X		X			X			X	
Maine	X	X					X				
Maryland	X			X	X	X		70%		X	Lower EAC
Massachusetts	X						X			X	
Michigan	X	X	X				X			X	
Minnesota		X					X			X	
Mississippi						X		70%		X	State MAC
Missouri	X	X	X	X	X			<70%		X	State MAC
Montana	X	X	X				X			X	
Nebraska		X		X			X			X	
Nevada	X			X			X			X	
New Hampshire		X					X			X	
New Jersey	X	X	X				X			X	
New Mexico				X	X		X			X	
New York		X	X	X	X			70%		X	
North Carolina	X				X	X		75%		X	
North Dakota	X	X					X			X	
Ohio	X						X			X	
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X	X		70%		X	State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	State MAC
South Carolina	X	X	X			X		70%		X	State MAC
South Dakota	X		X				X			X	State MAC
Tennessee							X			X	State MAC
Texas	X			X			X			X	State MAC
Utah		X	X	X			X			X	State MAC
Vermont	X			X			X			X	
Virginia		X	X	X			X			X	
Washington		X					X			X	State MAC
West Virginia	X						X			X	
Wisconsin	X		X	X	X		X			X	State MAC
Wyoming	No Medicaid Drug Program										

Reimbursement Methods - 1978

	AWP	AWP LESS DISCOUNT	WHOLESELLER SUPPLIED	SELECTED PRODUCTS		FEDERAL DECILE			AAC	USUAL AND CUSTOMARY	OTHER
				DIRECT	QUANTITY	YES	NO	PERCENT			
Alabama			X	X			X			X	
Alaska	Only State funded	State funded	drug program								
Arizona	No Medicaid Program										
Arkansas	X						X			X	
California	X			X	X		X			X	State MAC
Colorado			X	X	X		X			X	State MAC
Connecticut	X			X			X			X	
Delaware							X		X	X	
D.C.		X	X	X			X			X	
Florida		X			X		X			X	State MAC
Georgia	X		X		X		X			X	
Hawaii											
Idaho	X		X				X			X	
Illinois			X		X	X		50%	X	X	State MAC
Indiana						X		70%	X	X	
Iowa			X	X	X		X			X	
Kansas	X		X	X	X		X			X	
Kentucky	X		X	X	X		X			X	State MAC
Louisiana			X		X		X			X	
Maine	X		X				X			X	
Maryland	X			X	X	X		70%		X	Lower EAC
Massachusetts		X	X	X	X		X			X	
Michigan	X	X	X				X			X	State MAC
Minnesota			X				X			X	
Mississippi			X			X		70%		X	State MAC
Missouri	X		X	X	X	X		< 70%		X	State MAC
Montana	X		X	X			X			X	
Nebraska			X		X		X			X	
Nevada		X			X		X			X	
New Hampshire			X				X			X	
New Jersey	X	X	X				X			X	
New Mexico				X	X		X			X	
New York			X	X	X	X		70%		X	
North Carolina	X				X	X		75%		X	
North Dakota	X		X				X			X	
Ohio	X						X			X	
Oklahoma	X	X	X				X			X	
Oregon	X		X	X	X	X		70%		X	State MAC
Pennsylvania	X			X			X			X	
Rhode Island	X			X			X			X	State MAC
South Carolina	X	X	X			X		70%			State MAC
South Dakota	X		X				X			X	State MAC
Tennessee							X			X	State MAC
Texas	X			X			X			X	
Utah			X	X	X		X			X	State MAC
Vermont	X			X			X			X	
Virginia			X	X	X		X			X	
Washington			X				X			X	State MAC
West Virginia	X						X			X	
Wisconsin	X		X	X	X		X			X	State MAC
Wyoming	No Medicaid	Drug Program									

**State Medicaid Drug Programs Restrictions
1974 through 1978**

Program Restrictions - 1974

QUANTITY LIMITS	PRODUCT RESTRICTIONS					CO-PAYMENTS			Mini-MAC
	Rxs	S	Size	Formulary	Prior Auth	Yes	No	Amt	
Alabama	X			X		X			
Alaska				Only State-funded drug program				X	
Arizona				No Medicaid Program					
Arkansas	X						X	X	.50
California	X ¹		X		X				
Colorado			X	X		X			
Connecticut	X	X	X			X			
Delaware						X			
D. C.	X		X	X		X			
Florida	X	X	X	X		X			
Georgia	X		X		X		X		
Hawaii									
Idaho		X	X	X			X		
Illinois	X		X	X		X			
Indiana				X		X			
Iowa	X					X			
Kansas				X			X		
Kentucky	X		X		X		X		
Louisiana	X		X			X			
Maine	X		X				X		
Maryland	X		X			X			
Massachusetts	X					X			
Michigan	X		X			X			
Minnesota	X		X				X		
Mississippi	X		X		X		X		
Missouri			X		X		X		
Montana							X	X	.50 (over 2 refills)
Nebraska			X			X			
Nevada						X			
New Hampshire	X					X			
New Jersey	X		X			X			
New Mexico	X			X		X			
New York	X						X		
North Carolina				X			X	X	.50
North Dakota	X						X		
Ohio	X		X			X			
Oklahoma			No Drug Program						
Oregon				X	X			X	
Pennsylvania	X	X	X	X		X			
Rhode Island	X		X			X			
South Carolina	X		X		X	X			
South Dakota							X		
Tennessee	X		X	X			X		
Texas	X ¹		X				X		
Utah						X			
Vermont	X					X			
Virginia							X		
Washington		X	X		X			X	
West Virginia	X					X			
Wisconsin			X			X			
Wyoming			No Medicaid Drug Program						

¹ Limit on number of prescriptions per month

Program Restrictions - 1975

QUANTITY LIMITS	PRODUCT RESTRICTIONS					CO-PAYMENTS			Mini-MAC	
	Formulary		Prior Auth							
	Rxs	\$	Size	Open	Closed	Yes	No	Yes	No	Amt
Alabama	X			X		X		X		.50
Alaska	Only State-funded drug program									
Arizona	No Medicaid Program									
Arkansas	X						X	X		.50
California	X ¹		X		X	X			X	
Colorado			X	X		X			X	
Connecticut	X	X	X			X			X	
Delaware							X		X	
D. C.	X		X	X		X			X	
Florida	X	X	X	X		X			X	
Georgia	X		X	X			X	X		.50
Hawaii										
Idaho		X	X	X			X		X	
Illinois	X		X	X		X			X	
Indiana				X		X			X	
Iowa	X					X			X	
Kansas				X		X			X	
Kentucky	X		X		X	X			X	
Louisiana	X		X				X		X	
Maine	X		X				X		X	
Maryland	X		X			X			X	
Massachusetts	X					X			X	
Michigan	X		X			X			X	
Minnesota	X		X				X		X	
Mississippi	X		X		X		X		X	
Missouri		X		X	X		X		X	
Montana							X	X		.50 over 2 refills
Nebraska			X			X			X	
Nevada						X			X	
New Hampshire	X				X				X	
New Jersey	X		X	X			X ²			.25
New Mexico	X			X		X			X	
New York	X						X		X	
North Carolina							X	X		.50
North Dakota	X			X			X		X	
Ohio	X		X		X	X			X	
Oklahoma	X				X		X		X	
Oregon			X		X	X			X	
Pennsylvania	X	X	X	X		X			X	
Rhode Island	X		X			X			X	
South Carolina	X		X		X	X			X	
South Dakota			X				X		X	
Tennessee	X		X	X			X		X	
Texas	X ¹		X				X		X	
Utah				X		X			X	
Vermont	X					X			X	
Virginia							X	X		.50
Washington		X	X		X	X			X	
West Virginia	X					X			X	
Wisconsin			X			X			X	
Wyoming	No Medicaid Drug Program									

¹ Limit on number of prescriptions per month

² Only in effect August 1975 - March 1976

Program Restrictions - 1976

	QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			Mini-MAC	
	Rxs	\$	Size	Formulary		Prior Auth		Yes	No	Amt		
				Open	Closed	Yes	No					
Alabama	X			X		X		X		.50		
Alaska	Only State-funded		drug program									
Arizona	No Medicaid Program											
Arkansas	X ¹	X				X	X			.50	X	
California		X		X	X			X			X	
Colorado		X	X		X			X			X	
Connecticut	X	X	X			X			X			
Delaware						X			X			
D. C.	X	X	X			X			X			
Florida	X	X	X	X		X			X			
Georgia		X	X				X	X		.50		
Hawaii												
Idaho		X	X	X			X		X			
Illinois	X		X	X		X			X		X	
Indiana			X			X			X		X	
Iowa	X					X			X			
Kansas			X		X			X		.50		
Kentucky	X		X		X	X			X		X	
Louisiana	X		X				X		X			
Maine	X		X				X		X			
Maryland	X		X			X		X		.50		
Massachusetts	X					X			X			
Michigan	X		X			X			X			
Minnesota	X		X				X		X			
Mississippi	X		X		X		X	X		.50	X	
Missouri		X		X		X			X		X	
Montana							X	X		.50	(over 2 refills)	
Nebraska		X				X			X			
Nevada	X ¹					X		X		.50		
New Hampshire	X					X			X			
New Jersey	X		X		X	X		X ²		.25		
New Mexico	X			X		X			X			
New York	X						X		X			
North Carolina							X	X		.50		
North Dakota	X			X			X		X			
Ohio	X		X		X	X			X			
Oklahoma	X				X		X		X			
Oregon		X			X	X			X		X	
Pennsylvania	X	X	X	X		X			X			
Rhode Island	X		X			X			X		X	
South Carolina	X		X		X	X			X			
South Dakota			X				X	X		.50	X	
Tennessee	X		X	X		X			X		X	
Texas	X ¹		X				X		X			
Utah			X			X			X		X	
Vermont	X					X			X			
Virginia							X	X		.50		
Washington		X	X		X	X			X		X	
West Virginia	X		X			X			X			
Wisconsin			X			X			X		X	
Wyoming	No Medicaid Drug Program											

¹ Limit on number of prescriptions per month

² Only in effect August 1975 - March 1976

Program Restrictions - 1977

	QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			Mini-MAC
				Formulary	Prior Auth	Yes	No				
	Rxs	\$	Size	Open	Closed	Yes	No	Yes	No	Amt	
Alabama	X			X		X		X		.50	
Alaska	Only State-funded drug program										
Arizona	No Medicaid Program										
Arkansas	X ¹		X					X	X	.50	X
California			X		X	X			X		X
Colorado			X	X			X		X		X
Connecticut	X	X	X			X			X		
Delaware							X		X		
D. C.	X		X	X		X		X		.50	
Florida	X	X	X	X		X		X		.50	X
Georgia			X	X			X	X		.50	
Hawaii											
Idaho		X	X	X			X		X		
Illinois	X		X	X		X			X		X
Indiana				X		X			X		
Iowa	X					X			X		
Kansas				X		X		X		.50	
Kentucky	X		X		X	X			X		X
Louisiana	X		X		X		X		X		
Maine	X		X			X			X		
Maryland	X		X			X		X		.50	
Massachusetts	X					X			X		
Michigan	X		X			X		X		.50	
Minnesota	X		X				X		X		
Mississippi	X		X		X		X	X		.50	X
Missouri			X	X		X		X		X	
Montana							X	X		.50(over 2 refills)	
Nebraska			X			X			X		
Nevada	X ¹					X		X		.50	
New Hampshire	X					X			X		
New Jersey	X		X		X	X			X		
New Mexico	X			X		X			X	.25	
New York	X				X		X	X ²		.50(over 2 refills)	
North Carolina							X	X		.50	
North Dakota	X			X			X		X		
Ohio	X		X		X	X			X		
Oklahoma	X ¹				X		X		X		
Oregon			X		X	X			X		X
Pennsylvania	X	X	X			X			X		
Rhode Island	X		X			X			X		X
South Carolina	X		X		X	X		X		.50	
South Dakota			X				X	X		.50	X
Tennessee	X		X	X		X			X		X
Texas	X ¹		X				X		X		
Utah				X		X					X
Vermont	X					X			X		
Virginia							X	X		.50	
Washington		X	X		X	X			X		X
West Virginia	X		X			X			X		
Wisconsin			X			X			X		X
Wyoming	No Medicaid Drug Program										

¹ Limit on number of prescriptions per month

² Only in effect May 1977

Program Restrictions - 1978

STATE	QUANTITY LIMITS			PRODUCT RESTRICTIONS				CO-PAYMENTS			MINI-MAC	
	RXs	S	Size	Formulary		Prior Auth		Yes	No	Amt		
				Open	Closed	Yes	No					
Alabama	X			X		X		X		.50		
Alaska	Only State-Funded drug program									1		
Arizona	No Medicaid Program											
Arkansas	X ¹	X						X	X	.50	X	
California		X		X	X				X		X	
Colorado		X	X				X		X		X	
Connecticut	X	X	X			X			X			
Delaware							X		X			
D. C.	X		X	X		X		X		.50		
Florida	X	X		X		X			X		X	
Georgia		X	X				X	X		.50		
Hawaii												
Idaho		X	X	X				X				
Illinois	X		X	X		X			X		X	
Indiana				X		X			X			
Iowa	X					X			X			
Kansas				X		X		X		.50		
Kentucky	X		X		X	X			X		X	
Louisiana	X		X		X			X				
Maine	X		X			X			X			
Maryland	X		X		X	X		X		.50		
Massachusetts	X					X			X			
Michigan	X		X			X			X		X	
Minnesota	X		X				X		X			
Mississippi	X		X		X		X		X		X	
Missouri		X		X			X		X		X	
Montana								X	X	.50 (over 2 refills)		
Nebraska		X				X			X			
Nevada	X ¹					X			X	.50		
New Hampshire	X					X			X			
New Jersey	X		X		X	X			X			
New Mexico	X			X		X		X		.25		
New York	X				X		X		X			
North Carolina								X	X	.50		
North Dakota	X			X				X				
Ohio	X		X		X	X			X			
Oklahoma	X ¹				X		X		X			
Oregon			X	X		X			X		X	
Pennsylvania	X	X	X			X			X			
Rhode Island	X		X			X			X		X	
South Carolina	X		X		X	X			X	.50	X	
South Dakota			X					X	X	.50	X	
Tennessee	X		X	X		X			X		X	
Texas	X ¹		X				X		X			
Utah			X		X				X		X	
Vermont	X		X		X				X			
Virginia							X	X		.50		
Washington		X	X		X	X			X		X	
West Virginia	X		X			X			X			
Wisconsin			X			X			X		X	
Wyoming	No Medicaid Drug Program											

¹ Limit on number of prescriptions per month

State Medicaid Drug Program Professional Fees
1974 through 1979

State Medicaid Drug Program Dispensing Fees: 1974 - 1978

	1974		1975		1976		1977		1978	
	Type	Amount**	Type	Amount**	Type	Amount**	Type	Amount**	Type	Amount**
Alabama	F	1.90	F	1.90	F	1.90	F	2.25	F	2.25
Alaska										
Arizona										
Arkansas	F	2.00	F	2.00	F	2.00	F	2.70	F	3/1: 2.87
California	F	2.42	F	7/1: 2.70	F	9/1: 2.86	F	3/6: 3.06	F	3.06
Colorado	F	2.00	F	2.00	F	2.00	F	7/1: 2.50	F	12/1: 2.90
Connecticut	F	1.90	F	2.20	F	2.20	F	2.20	F	2.52
Delaware	F	2.00	F	2.00	F	2.00	F	2.00	F	7/1: 2.50
Dist. of Columbia	F	1.60	F	1.80	F	1.80	F	1.80	F	2.59
Florida	M	33-40%	M	33-40%	M	33-40%	F	7/1: 2.40	F	7/1: 2.75
Georgia	F	2.00	F	2.00	F	2.00	F	2.19	F	2.35
Hawaii										
Idaho							V	2.25-3.30	V	2.25-3.30
Illinois	F	1.35 + .30%	F	2.05	F	8/1: 2.35	F	2.35	F	7/1: 2.75
Indiana	F	1.85	F	1.85	F	2.25	F	2.25	F	2.25
Iowa	F	2.15	F	2.15	F	2.15	F	2.55	F	2.55

* F = Flat Fee; V = Variable Fee; M = Percent Markup

** Amount in dollars or percent markup

Footnotes to this table are on page A-19.

State Medicaid Drug Program Dispensing Fees: 1974 - 1978

	1974	1975	1976	1977	1978
*	Amount**	Amount**	Amount**	Amount**	Amount**
Kansas	V 1.19-2.15	V 1.24-2.25	V 1.29-2.25	V 1.30-2.35	V
Kentucky	F 1.65	F 1.80	F 1.80	F 1.80	F 2.22
Louisiana	F 9/1: 2.10	F 2.10	F 2.10	F 8/15: 2.35	F 7/15: 2.80
Maine	F 2.00	F 2.00	F 2.00	F 2.00	F 2.00
Maryland	F 1.75	F 7/1: 2.00	F 2.00	F 7/1: 2.25	F 7/1: 2.45
Massachusetts	F 1.85	F 2/1: 2.10	F 2.10	F 2.10	F 10/1: 2.70
Michigan	F 2.15	F	F 2.19 (max)	F 2.40	F 6/1: 2.50 10/1: 2.75
Minnesota	V 1.20-5.00	V 1.20-5.00	V 1.20-5.00	V 1.20-5.00	V 1.20-5.00
Mississippi	F 1.75	F 1.75	F 1.75	F 5/1: 2.25	F 2.25
Missouri	F 1.25	F 1.50	F 1.75	F 2.25	F 2.25
Montana			M 40%	V 2.00-3.25	V 2.00-3.25
Nebraska	V 1.75-2.45	V 1.75-2.45	V 1.75-2.45	V	V 2.20-2.70
Nevada	F 2.40	F 2.40	F 2.75	F 2.90	F 3.10

* F = Flat Fee; V = Variable Fee; M = Percent Markup

** Amount in dollars or percent markup

Footnotes to this table are on page A-19.

State Medicaid Drug Program Dispensing Fees: 1974 - 1978

Type*	1974		1975		1976		1977		1978	
	Amount**	Type**	Amount**	Type**	Amount**	Type**	Amount**	Type**	Amount**	Type**
New Hampshire	F	2.20	F	2.20	F	2.20	F	2.20	F	10/1: 2.70
New Jersey	V	2.05-2.15	V	8/1: 1.80-1.90	V	1.80-1.90	V	2.05-2.15	V	2.20-2.50
New Mexico	F	2.00	F	2.00	F		F	2.50	F	9/1: 2.65
New York	F	1.80, NYC 2.00	F	1.80, NYC 2.00	F	1.80, NYC 2.00	F	1.80, NYC 2.00	F	7/1: 2.60 ²
North Carolina	F	2.00	F	2.50	F	2.50	F	2.50	F	2.50
North Dakota							F	7/1: 2.50	F	5/1: 2.75
Ohio	F	2.00	F	2.00	F	2.00	F	2.60	F	2.60
Oklahoma			F	7/1: 2.50	F	2.50	F	2.50	F	2.50
Oregon	M	\$.85 + 50%	M	\$.85 + 50%	F	2.35	F	2.55	F	2.70
Pennsylvania	M	50%	F	1.85	F	1.85	F	7/1: 2.00	F	2.00
Rhode Island	F	1/1: 1.90 7/1: 2.00	F	2.00	F	2.00	F	1/1: 2.15 7/1: 2.20	F	2.20
South Carolina	F	1.90	F	1.90	F	1.90	F	2.40	F	2.50
South Dakota			F	2.25	F	2.25	F	7/1: 2.50	F	2.50
Tennessee	F	1.95	F	2.10	F	2.10	F	2.10	F	2.30

* F = Flat Fee; V = Variable Fee; M = Percent Markup

** Amount in dollars or percent markup
 Footnotes to this table are on page A-19.

State Medicaid Drug Program Dispensing Fees: 1974 - 1978

1974		1975		1976		1977		1978	
Type*	Amount**	Type*	Amount**	Type*	Amount**	Type*	Amount**	Type*	Amount**
Texas	V	V	9/1: 1.94-2.39	V		V		V	3/1: 2.25-2.82
Utah	F	2.00	F	2.20	F	2.20	F	10/1:	2.40
Vermont	F	1.75	F	1.85	F	1.85	F		2.40
Virginia	F	1.95	F	1.95	F	1.95	F	1.85	2.00 ³
West Virginia	M	50% for 1.50-2.99; 33% for 3.00-7.99; 25% over 8.00 (1974-77)							11/1: 2.25
Wisconsin	V	2.05-2.25	V	2.05-2.25	V	2.05-2.55	F	7/1:	2.40
Wyoming									7/1: 2.65

* F = Flat Fee; V = Variable Fee; M = Percent Markup

** Amount in dollars or percent markup

Footnotes to this table are on page A-19.

Footnotes:

1 - Fee was set at \$1.75 beginning 8/1 for two months then rose to \$1.85.
Approximately a month later it was raised to \$2.05.

2 - From 4/1 to 7/1 fee was \$2.10 for the state, \$2.30 for NYC. Raised 7/1
to \$2.60 for both.

3 - 10% markup if drug cost exceeds \$20.00.

4 - 40% markup until 8/1.

5 - Fee is \$2.60 if pharmacy does less than 35,000 Rx's per year.

Status of Substitution Laws - December 1978

Status of Substitution Laws
(as of December 1978)

STATE	Existence of a Substitution Law			Formulary-Type Approach		When Allowed	
	YES	NO	YEAR ENACTED	POSITIVE	NEGATIVE	MD INDICATING	UNLESS MD INDICATES
Alabama		X					
Alaska	X		1976			X	
Arizona	X		1978	X		X	
Arkansas	X		1975		X		X
California	X		1975		X		X
Colorado	X		1976				X
Connecticut	X		1976				X
Delaware	X		1976		X	X	
D.C.	X		1976	X			X
Florida	X		1976		X		X
Georgia	X		1977			X	
Hawaii		X					
Idaho	X		1978			X	
Illinois	X		1977	X		X	
Indiana		X					
Iowa	X		1976		X		X
Kansas	X		1978				X
Kentucky	X		1976	X			X
Louisiana		X					
Maine	X		1975				X
Maryland	X		1977		X		X
Massachusetts	X		1976	X		X	
Michigan	X		1976				X
Minnesota	X		1974				X
Mississippi		X					
Missouri	X		1978		X	X	
Montana	X		1977				X
Nebraska	X		1977		X		X
Nevada		X					
New Hampshire	X		1973	X		X	
New Jersey	X		1977	X			X
New Mexico	X		1976	X			X
New York	X		1977	X		X	
North Carolina		X					
North Dakota		X					

KEY: Positive Formulary--List of drugs that may be substituted.

Negative Formulary--List of drugs that may not be substituted.

MD Indicates--Pharmacist may substitute only if physician allows,
usually indicated by signing on the appropriate line
of the prescription

Unless MD Indicates--Pharmacist may substitute unless physician
indicates otherwise.

Status of Substitution Laws
 (as of December 1978)

STATE	Existence of a Substitution Law			Formulary-Type Approach		When Allowed	
	YES	NO	YEAR ENACTED	POSITIVE	NEGATIVE	MD INDI- CATING	UNLESS MD INDICATES
Ohio	X		1977				X
Oklahoma		X					
Oregon	X		1975				X
Pennsylvania	X		1976	X		X	
Rhode Island	X		1976	X		X	
South Carolina	X		1978			X	
South Dakota	X		1978			X	
Tennessee	X		1977	X			X
Texas		X					
Utah	X		1977		X		X
Vermont	X		1978				X
Virginia	X		1977	X		X	
Washington	X		1977		X	X	
West Virginia	X		1978		X		
Wisconsin	X		1976	X			X
Wyoming		X					

KEY: Positive Formulary--List of drugs that may be substituted.

Negative Formulary--List of drugs that may not be substituted.

MD Indicates--Pharmacist may substitute only if physician allows,
 usually indicated by signing on the appropriate line
 of the prescription.

Unless MD Indicates--Pharmacist may substitute unless physician
 indicates otherwise.

Administration of Medicaid Drug Programs

Administration of Medicaid Drug Programs

State	Who Administers?			Administrative Costs
	State	Fiscal Agent	Comments	
AL		77-78 BC*	EDSF 74-76	78: 10-11¢ per claim
AK				
AZ				
AR		BC	Paid 74-76	78: \$77,067 per month
CA		BS	Through 1978	
CO	X			78: 30-35¢ per claim
CT		Pilgrim		
DE		TCC	BC 74-77	
DC	X			
FL		SDC	Paid 74-76, EDSF 77	
GA	X			
HI				
ID		EDSF		
IL	X			78: 20-25¢ per claim
IN		BC/BS		
IA		BC/BS		\$1 million a year
KS		EDSF	BD/BS before 1978	
KY	X			
LA		77-78 EDSF	LNI 75, TCC 76	
ME		HSM		78: 44¢ per claim
MD	X			78: 2.2% of total cost
MA		Pilgrim		78: 30¢ per claim
MI	X			78: 40¢ per claim
MN				
MS		BC/BS		78: 51¢ per claim
MO	X			
MT		Dikewood		78: \$600,000
NE	X			
NV		BS	State does processing	
NH	X			
NJ		BC		78: 33¢ per claim
NM		EDSF		78: 64¢ per claim
NY		Bradford	Since 1977	
NC		77-78 TCC	Paid 75, EDSF 75-76	78: \$890,770
ND	X			
OH				
OK	X			
OR	X			
PA		BC		
RI	X			
SC	X			
SD	X			
TN		EDSF	BC 74-77	78: 34¢ per claim
TX	X			78: 3.6% of total cost
UT	X			
VT		BC/BS		
VA		TCC		
WA		EDSF		
WV	X			
WI		EDSF		78: 87¢ per claim
WY				

* BC = Blue Cross; BS = Blue Shield; EDSF = Electronic Data Systems-Federal;
 HSM = Health Systems Maintenance; LNI = Lincoln National Insurance;
 SDC = Systems Development Corporation; TCC = The Computer Company

Individual State Profiles

STATE SUMMARY

State: ALABAMA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	23.08	25.80	21.88	21.93	20.61	
Yearly Cost/Recipient	\$87.38	\$124.82	\$109.61	\$23.13	\$135.44	
Average Rx Price	\$ 3.79	\$ 5.34	\$ 5.51	\$ 6.11	\$ 7.07	
<u>DISPENSING FEE</u>						
Flat						
Variable	X	X	X	X	X	Due to exceptions
Amount	1.90	1.90	1.90	1.99	2.25	\$1.80 nursing home/\$1.20 state hosp
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.				X	X	
Quan. Price/Select Product						
Federal Decile						Use only as ref
Decile Number						
Actual Acquisition Cost	X	X	X			
Usual and Customary				X	X	As of Oct. 77
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	Based on Ala Drug Index Code
Anti-substitution	X	X	X	X	X	Plan to repeal
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment		.50	.50	.50	.50	



STATE SUMMARY

State: ARKANSAS

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	12.58	10.66	20.86	20.70	21.35	
Yearly Cost/Recipient	\$73.76	\$140.27	\$128.02	\$146.31	\$164.09	
Average Rx Price	\$ 6.36	--	\$ 6.64	\$ 7.57	\$ 8.19	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	\$2.00	\$2.00	\$2.00	\$2.60	\$2.84	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X					Repealed 1975
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit			X	X	X	30 day maximum
Prior Authorization						
State MAC			X	X	X	Established 1976
Co-payment	.50	.50	.50	.50	.50	

STATE SUMMARY

State: CALIFORNIA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	16.05	17.04	17.62	16.92	9.42	
Yearly Cost/Recipient	\$87.43	\$105.31	\$117.58	\$108.62	\$113.00	
Average Rx Price	\$ 5.45	\$ 6.18	\$ 6.67	\$ 6.42	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.42	2.60	2.75	3.03	3.06	Interim fee: 1977-78
Percent Markup Used						OTCs 50%
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	1977 EAC*
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.				X	X	
Quan. Price/Select Product				X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	C	C	C	C	1966 closed formulary Own st. food/ drug list
Anti-substitution	X					Repealed 1975
Quantity Limit	X	X				Ended Jul 1, 75
Dollar Limit						
Size Limit	X	X	X	X	X	
Prior Authorization	X	X	X	X	X	Selected drugs
State MAC	X	X	X	X	X	
Co-payment						

1) AWP - 100's

2) Direct prices
11 Manuf. w/low min
atv

3) 12 drugs at 500 or 1000 prices

C-39

STATE SUMMARY

State: COLORADO

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	--	--	9.00	--	--	
Yearly Cost/Recipient	--	\$123.14	\$115.52	\$123.09	\$142.44	
Average Rx Price	--	--	--	--	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.00	2.00	2.00	2.25	2.53	Effective 12/1/78
Percent Markup Used						
<u>INGREDIENT COST</u>						Adopted EAC 1978
AWP	X	X	X	X	X	
AWP Less Discount						Only on one drug
Wholesaler Supplied		X	X	X	X	If not Red Book
Direct Price/Select Prod.					X	
Quan. Price/Select Product					X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X				Repealed 1976
Quantity Limit						
Dollar Limit						
Size Limit	X	X	X	X	X	No more than 100 day supply
Prior Authorization	X	X	X	X		
State MAC	X	X	X	X	X	1972
Co-payment						

STATE SUMMARY

State: CONNECTICUT

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	18.47	8.45	9.07	9.76	9.53	
Yearly Cost/Recipient	\$81.38	\$101.43	\$128.85	\$114.32	\$114.34	
Average Rx Price	\$ 4.41	--	--	--	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.90	2.20	2.20	2.20	2.36	Lower fee nurs homes
Percent Markup Used						OTCs 50%
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.			X	X	X	
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X				
Quantity Limit	X	X	X	X	X	
Dollar Limit	10.00	10.00	10.00	16.00	25.00	No limit July 1978
Size Limit	X	X	X	X	X	30 day supply
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment						

STATE SUMMARY

State: DELAWARE

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	17.67	16.41	16.84	15.55	14.01	
Yearly Cost/Recipient	\$86.17	\$85.79	\$94.29	\$90.03	\$83.91	
Average Rx Price	\$ 4.88	\$ 5.23	\$ 5.60	\$ 5.79	\$ 5.99	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.00	2.00	2.00	2.00	2.25	Effective 7/1/78
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost	X	X	X	X	X	
Usual and Customary	X	X	X	X	X	If lower than AAC + 2.00
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X				
Quantity Limit						Utilization Review
Dollar Limit						
Size Limit						
Prior Authorization						Only restriction must be legend drug
State MAC						
Co-payment						

STATE SUMMARY

State: DISTRICT OF COLUMBIA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	19.83	20.71	20.41	17.23	6.67	
Yearly Cost/Recipient	\$81.90	\$96.06	\$20.41	\$17.23	\$92.29	
Average Rx Price	\$ 4.13	\$ 4.64	\$ 4.98	\$ 6.02	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable	.					
Amount	1.60	1.80	1.80	1.80	2.59	
Percent Markup Used						OTCs only Cost + 50%
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	90% local wholesale 10% ave. wholesale price
Direct Price/Select Prod.					X	Only on 5 items
Quan. Price/Select Product			X	X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary			X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X				
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	1 mo supply (antibiotics 10 day)
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment				.50	.50	

STATE SUMMARY

State: FLORIDA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	17.67	23.80	22.24	22.55	10.00	
Yearly Cost/Recipient	\$ 84.55	\$128.12	\$119.20	\$138.02	\$119.82	
Average Rx Price	\$ 4.78	\$ 5.38	\$ 5.36	\$ 6.62	--	
<u>DISPENSING FEE</u>						
Flat				X	X	
Variable						
Amount				2.40	2.58	
Percent Markup Used	37	37	37			Varied 16%-100% Average 33 3-40%
<u>INGREDIENT COST</u>						Prior to 7/77 Then MAC/EAC implemented
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied				X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product				X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X				
Quantity Limit	X	X	X	X	X	
Dollar Limit	20.00	20.00	20.00	20.00	22.00	Nursing homes \$30.00
Size Limit	X	X	X	X		34 day supply
Prior Authorization	X	X	X	X	X	
State MAC				X	X	
Co-payment				.50		11/77 through 11/78 only

STATE SUMMARY

State: GEORGIA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	16.68	25.95	27.62	33.80	30.61	
Yearly Cost/Recipient	\$84.85	\$134.22	\$143.59	\$196.50	\$185.83	
Average Rx Price	\$ 5.09	\$ 5.67	\$ 5.70	\$ 6.31	\$ 6.57	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	\$2.00	\$2.00	\$2.00	\$2.19	\$2.35	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP		X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product		X	X	X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	30 day supply
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	O	O	O	O	With exceptions
Anti-substitution	X	X	X			
Quantity Limit	X	X				
Dollar Limit						Rx over \$50 reviewed
Size Limit	X	X	X	X	X	30 day supply
Prior Authorization						
State MAC						
Co-payment		.50	.50	.50	.50	Effective 8/1/75

STATE SUMMARY

State: IDAHO

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	21.17	18.43	16.40	15.73	17.49	
Yearly Cost/Recipient	\$103.62	\$95.84	\$91.28	\$93.69	\$102.15	
Average Rx Price	\$ 4.89	\$ 5.20	\$ 5.57	\$ 5.96	\$ 5.84	
<u>DISPENSING FEE</u>						
Flat						
Variable				X	X	Prior to 1977 no billing restrictions
Amount				2.25 - 3.30	2.25 - 3.30	
Percent Markup Used						
<u>INGREDIENT COST</u>	Oct '71 - Aug '77					
AWP		Whatever pharmacist billed program paid		X	X	
AWP Less Discount						
Wholesaler Supplied				X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost	X	X	X			
Usual and Customary				X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X	X	X		
Quantity Limit						
Dollar Limit	20.00	20.00	20.00	20.00	35.00	\$35 effective 7/1/78
Size Limit	X	X	X	X	X	34 day supply
Prior Authorization						
State MAC						
Co-payment						

STATE SUMMARY

State: ILLINOIS

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	18.77	18.32	18.06	18.77	19.89	
Yearly Cost/Recipient	\$72.78	\$85.68	\$87.28	\$91.55	\$100.39	
Average Rx Price	\$ 4.94	\$ 4.68	\$ 4.83	\$ 4.88	\$ 5.05	
<u>DISPENSING FEE</u>						
Flat		X	X	X	X	
Variable						
Amount		\$1.93	\$2.18	\$2.35	\$2.55	
Percent Markup Used	30%					\$1.35 plus 30%
<u>INGREDIENT COST</u>						
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	To some extent
Direct Price/Select Prod.						
Quan. Price/Select Product	X	X	X	X	X	
Federal Decile			X	X	X	
Decile Number			50%	50%	50%	
Actual Acquisition Cost	X	X	X	X	X	
Usual and Customary	X	X	X	X		
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X	X			
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply
Prior Authorization	X	X	X	X	X	
State MAC	X	X	X	X	X	
Co-payment						

STATE SUMMARY

State: INDIANA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	27.61	28.95	39.57	40.15	--	
Yearly Cost/Recipient	\$117.26	\$128.09	\$173.65	\$190.93	\$208.48	
Average Rx Price	\$ 4.25	\$ 4.25	\$ 4.39	\$ 4.75	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	\$1.85	\$1.85	\$2.05	\$2.25	\$2.25	Interim
Percent Markup Used	50%	50%	50%	50%	50%	
<u>INGREDIENT COST</u>						
AWP	X	X	X			AWP still in effect
AWP Less Discount		.				
Wholesaler Supplied	X	X	X			
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile			X	X	X	
Decile Number			Below 70%	70%	70%	
Actual Acquisition Cost	X	X	X	X	X	
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X	X	X	X	
Quantity Limit						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Schedule II Drugs
State MAC			X			
Co-payment						

STATE SUMMARY

State: IOWA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	19.60	21.32	20.87	19.82	--	
Yearly Cost/Recipient	\$92.96	\$109.64	\$118.46	\$116.48	\$137.61	
Average Rx Price	\$ 4.74	\$ 5.14	\$ 5.68	\$ 5.88	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	\$2.15	\$2.15	\$2.15	\$2.55	\$2.55	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	Otherwise use manuf. cat.
Direct Price/Select Prod.	X	X	X	X	X	
Quan. Price/Select Product	X	X	X	X	X	Tablets 100 & 500 price
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X				Repealed Jul 76
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Began 1972
State MAC						
Co-payment						

STATE SUMMARY

State: KANSAS

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	28.31	28.59	27.44	27.26	--	
Yearly Cost/Recipient	\$121.45	\$131.81	\$154.99	\$151.06	\$136.22	
Average Rx Price	\$ 4.29	\$ 4.61	\$ 6.15	\$ 6.04	--	
<u>DISPENSING FEE</u>						
Flat						
Variable	X	X	X	X	X	
Amount	1.22 to 2.20	1.27 to 2.25	1.29 to 2.30	1.30 to 2.30	1.30 to 2.50	Some drugs (Over the counter)
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	EAC since 1973
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	Kansas Wholesalers
Direct Price/Select Prod.	X	X	X	X	X	7 manufacturers
Quan. Price/Select Product	X	X	X	X	X	100 & pint size
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						No approved formulary, List of NDC & prices
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X	X	X	X	Repealed Jul 78
Quantity Limit						
Dollar Limit						
Size Limit						
Prior Authorization		X	X	X	X	October 1975
State MAC						
Co-payment			.50	.50	.50	

STATE SUMMARY

State: KENTUCKY

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	24.41	24.36	22.57	20.83	--	
Yearly Cost/Recipient	\$78.96	\$83.35	\$80.21	\$73.58	\$108.21	
Average Rx Price	\$ 3.23	\$ 3.24	\$ 3.55	\$ 3.53	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.65	1.80	1.80	1.80	2.22	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.	X	X	X	X	X	
Quan. Price/Select Product	X	X	X	X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						Prices supplied by pharm.
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	C	C	C	C	
Anti-substitution	X	X				
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	Removed in 1978
Prior Authorization		X	X	X	X	Non-formulary drugs
State MAC	X	X	X	X	X	Implemented 1961
Co-payment						

STATE SUMMARY

STATE: LOUISIANA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	18.15	33.38	31.98	26.55	26.69	
Yearly Cost/Recipient	\$94.34	\$173.94	\$186.11	\$186.23	\$188.87	
Average Rx Price	\$ 5.20	\$ 5.21	\$ 5.82	\$ 7.01	\$ 7.08	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.90	2.10	2.10	2.17	2.56	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product	X	X	X	X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary				C	C	
Anti-substitution	X	X	X	X	X	
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply
Prior Authorization						
State MAC						
Co-payment						

STATE SUMMARY

MAINE
State: _____

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	--	--	--	--	--	
Yearly Cost/Recipient	\$53.26	\$95.71	\$98.70	\$109.31	\$113.81	
Average Rx Price	--	--	--	--	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.00	2.00	2.00	2.00	2.00	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary					X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X					Repealed 1975
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	180 day supply
Prior Authorization				X	X	
State MAC						
Co-payment						

STATE SUMMARY

State: MARYLAND

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	21.50	19.82	20.40	17.70	--	
Yearly Cost/Recipient	\$97.42	\$97.73	\$120.39	\$107.97	\$118.43	
Average Rx Price	\$ 4.53	\$ 4.93	\$ 6.40	\$ 6.60	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.75	1.88	2.00	2.13	2.35	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	Red Book Prices
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.	X	X	X	X	X	
Quan. Price/Select Product	X	X	X	X	X	
Federal Decile				X	X	X
Decile Number			70%	70%	70%	
Actual Acquisition Cost	Reserve	rt to limit pr	ices below EAC	(1976-1978)		
Usual and Customary			X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary					C	
Anti-substitution	X	X	X			Effective 1977
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	100 day/or Rx + 2 refills
Prior Authorization	X	X	X	X	X	Over \$20 for Rx
State MAC						
Co-payment			.50	.50	.50	

STATE SUMMARY

State: MASSACHUSETTS

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	--	--	10.41	--	10.63	
Yearly Cost/Recipient	\$39.07	\$91.93	\$58.89	\$62.40	\$69.98	
Average Rx Price	--	--	\$ 5.66	--	\$ 6.59	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.85	2.08	2.10	2.10	2.23	Effective 9/14/78
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X		
AWP Less Discount					X	Less 5%
Wholesaler Supplied					X	Generic drug medians
Direct Price/Select Prod.					X	40 drugs
Quan. Price/Select Product					X	500-1000 size/less 5%
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	5 refills in 6 mos.
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution						
Quantity Limit						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	For spec requests
State MAC						
Co-payment						

STATE SUMMARY

State: MICHIGAN

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	20.90	25.30	22.24	20.08	21.44	
Yearly Cost/Recipient	\$93.85	\$126.43	\$118.81	\$125.54	\$135.86	
Average Rx Price	\$ 4.49	\$ 5.00	\$ 5.34	\$ 6.75	\$ 6.34	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.15	2.17	2.19	2.31	2.52	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount	X	X	X	X	X	
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost	X	X	X			
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X				Repealed 1975
Quantity Limit	X	X	X	X	X	Rx plus 3 refills in 20 days
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply
Prior Authorization	X	X	X	X	X	For anorexics
State MAC					X	
Co-payment				.50		Rescinded after 6 mos.

STATE SUMMARY

State: MINNESOTA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	23.63	18.76	25.38	--	--	
Yearly Cost/Recipient	\$113.51	\$100.33	\$147.62	\$148.39	\$155.79	
Average Rx Price	\$ 4.80	\$ 5.35	\$ 5.82	--	--	
<u>DISPENSING FEE</u>						
Flat	Lower of state maximum charge or pharmacists submitted charge					
Variable	X	X	X	X	X	\$1.20 - \$5.00
Amount	1.20 to 5.00	1.20 to 5.00	1.20 to 5.00	1.20 to 5.00	1.20 to 5.00	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution						Repealed 1974
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	30 day acute supply
Prior Authorization						
State MAC						
Co-payment						

STATE SUMMARY

State: MISSISSIPPI

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	28.94	30.09	31.57	27.31	--	
Yearly Cost/Recipient	\$125.55	\$146.16	\$182.60	\$161.68	\$180.21	
Average Rx Price	\$ 4.34	\$ 4.86	\$ 6.28	\$ 6.42	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.75	1.75	1.75	2.08	2.25	
Percent Markup Used	50%	50%	50%	50%	50%	
<u>INGREDIENT COST</u>						
AWP	X	X				
AWP Less Discount						
Wholesaler Supplied	X	X				
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile			X	X	X	
Decile Number			70%	70%	70%	
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	C	C	C	C	
Anti-substitution	X	X	X	X	X	
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	1 month supply
Prior Authorization						
State MAC	X	X	X	X	X	
Co-payment			.50	.50		

STATE SUMMARY

State: MISSOURI

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	21.12	21.04	20.93	--	23.73	
Yearly Cost/Recipient	\$82.29	\$85.46	\$96.35	\$105.62	\$131.14	
Average Rx Price	\$ 3.90	\$ 4.06	\$ 4.60	--	\$ 5.53	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.25	1.38	1.63	2.00	2.25	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.	X	X	X	X	X	
Quan. Price/Select Product	X	X	X	X	X	
Federal Decile			X	X	X	
Decile Number			70 or below	70 or below	70 or below	
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	C	C	C	C	Since 1967
Anti-substitution	X	X	X	X		Repealed 1978
Quantity Limit						
Dollar Limit						
Size Limit	X	X	X	X	X	Removed in 1979
Prior Authorization						
State NAC	X	X	X	X	X	
Co-payment						

STATE SUMMARY

State: MONTANA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	16.70	26.11	24.31	--	28.65	
Yearly Cost/Recipient	\$ 82.65	\$118.12	\$119.26	\$146.33	\$152.02	
Average Rx Price	\$ 5.45	\$ 5.02	\$ 5.41	--	\$ 5.81	
<u>DISPENSING FEE</u>						
Flat						
Variable			X	X	X	
Amount			2.00	2.00	2.00	Up to \$3.25
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP			X	X	X	
AWP Less Discount						
Wholesaler Supplied			X	X	X	
Direct Price/Select Prod.			X	X	X	
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X	X			Repealed 1977
Quantity Limit						
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment	.50	.50	.50	.50	.50	Over 2 refills

STATE SUMMARY

State: NEBRASKA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	26.06	26.45	27.78	26.91	26.85	
Yearly Cost/Recipient	\$137.31	\$146.99	\$165.90	\$174.40	\$187.79	
Average Rx Price	\$ 5.27	\$ 5.56	\$ 5.97	\$ 6.48	\$ 7.00	
<u>DISPENSING FEE</u>						
Flat					X	
Variable	X	X	X	X		
Amount	1.75 to 2.45	1.75 to 2.45	1.75 to 2.45	1.75 to 2.45	2.20 to 2.79	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP			X			
AWP Less Discount	X	X		X	X	
Wholesaler Supplied	X	X		X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product				X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary				X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X	X			
Quantity Limit						
Dollar Limit						
Size Limit	X	X	X	X	X	
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment						

STATE SUMMARY

NEVADA

State: _____

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	19.68	21.31	21.20	17.90	18.72	
Yearly Cost/Recipient	\$112.27	\$131.45	\$158.33	\$125.41	\$140.88	
Average Rx Price	\$ 5.71	\$ 6.17	\$ 7.97	\$ 7.51	\$ 8.02	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.40	2.58	2.83	3.00	3.10	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X				
AWP Less Discount			X	X	X	
Wholesaler Supplied	X	X				
Direct Price/Select Prod.			X	X	X	
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary			X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X	X	X	X	
Quantity Limit			3	3	3	
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment			.50	.50	.50	

STATE SUMMARY

State: NEW HAMPSHIRE

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	22.03	26.28	22.89	22.40	--	
Yearly Cost/Recipient	\$106.83	\$125.66	\$117.26	\$121.47	\$129.88	
Average Rx Price	\$ 4.85	\$ 4.78	\$ 5.12	% 5.42	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.20	2.20	2.20	2.20	2.33	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X			
AWP Less Discount			X	X	X	
Wholesaler Supplied						
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary			X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution						
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	For non-covered items
State MAC						
Co-payment						

STATE SUMMARY

State: NEW JERSEY

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	17.55	19.04	17.73	19.18	19.83	
Yearly Cost/Recipient	\$76.22	\$94.94	\$91.97	\$101.72	\$117.44	
Average Rx Price	\$ 4.34	\$ 5.24	\$ 5.44	\$ 5.30	\$ 5.92	
<u>DISPENSING FEE</u>						
Flat						
Variable	X	X	X	X	X	
Amount	2.05	1.95	1.80	2.05	2.20	Up to 2.15 now 2.50
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount	X	X	X	X	X	
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost	If other ingred cost not applicable manuf wholesale suggested used					
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary		C	C	C	C	
Anti-substitution	X	X	X			Implementation in April 1979
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	60 day supply
Prior Authorization	X	X	X	X	X	Specified drugs
State MAC						
Co-payment		.25	.25			Aug 75 - Mar 76

STATE SUMMARY

State: NEW MEXICO

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	16.01	18.81	18.19	18.04	12.42	
Yearly Cost/Recipient	\$85.67	\$106.73	\$112.79	\$127.42	\$93.00	
Average Rx Price	\$ 5.35	\$ 5.68	\$ 6.20	\$ 7.31	\$ 7.74	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	\$2.00	\$2.00	\$2.39	\$2.50	\$2.55	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied	X	X	X			
Direct Price/Select Prod.			X	X	X	
Quan. Price/Select Product			X	X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X				
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Selected drugs
State MAC						
Co-payment			.25	.25		

STATE SUMMARY

State: NEW YORK

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	--	6.25	6.66	--	8.00	
Yearly Cost/Recipient	--	\$74.96	\$79.94	\$98.40	\$96.03	
Average Rx Price	--	--	--	--	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.80	1.80	1.80	1.80	2.21	NYC \$2.00 1/1/75 NYC 2.30 4/1/78
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X			
AWP Less Discount						
Wholesaler Supplied			X	X	X	
Direct Price/Select Prod.			X	X	X	Top 100-200 drugs
Quan. Price/Select Product			X	X	X	
Federal Decile			X	X	X	
Decile Number			Below 70s	70s	70s	
Actual Acquisition Cost			X	X	X	
Usual and Customary			X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary				C	C	
Anti-substitution	X	X	X			
Quantity Limit	X	X	X	X	X	
Dollar Limit						Automatic review of Rx's over \$50
Size Limit						
Prior Authorization						
State MAC						
Co-payment				.50		Lasted 1 month

STATE SUMMARY

State: NORTH CAROLINA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	--	--	16.84	24.71	25.26	
Yearly Cost/Recipient	\$128.73	\$193.95	\$109.19	\$178.36	\$181.40	
Average Rx Price	--	--	\$ 6.98	\$ 7.72	\$ 7.68	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.00	2.25	2.50	2.50	2.50	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						For selected drugs
Wholesaler Supplied						
Direct Price/Select Prod.						
Quan. Price/Select Product	X	X	X	X	X	
Federal Decile				X	X	
Decile Number				75	75	
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X	X	X	X	
Quantity Limit						
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment	.50	.50	.50	.50	.50	

STATE SUMMARY

State: NORTH DAKOTA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	38.69	32.18	31.20	25.51	28.88	
Yearly Cost/Recipient	\$227.83	\$197.10	\$189.47	\$180.59	\$188.45	
Average Rx Price	\$ 5.89	\$ 6.13	\$ 6.07	\$ 7.08	\$6.52	
<u>DISPENSING FEE</u>						
Flat	No dispensing fee (1974 - 1976)			X	X	
Variable						
Amount				2.50	2.67	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP			X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary				X	X	7/1/77
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X	X	X	X	
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment						

STATE SUMMARY

State: OHIO

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	25.08	24.03	23.88	--	21.26	
Yearly Cost/Recipient	\$112.37	\$114.34	\$122.06	\$116.33	\$120.33	
Average Rx Price	\$ 4.48	\$ 4.76	\$ 5.11	--	\$ 5.66	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	2.00	2.00	2.00	2.60	2.60	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary		C	C	C	C	
Anti-substitution	X	X	X			
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	
Prior Authorization	X	X	X	X	X	
State MAC						
Co-payment						

STATE SUMMARY

State: OKLAHOMA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	--	--	--	--	--	
Yearly Cost/Recipient	--	--	--	--	--	
Average Rx Price	--	--	--	--	--	
<u>DISPENSING FEE</u>						
Flat		X	X	X	X	
Variable						
Amount		2.50	2.50	2.50	2.50	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP		X	X	X	X	
AWP Less Discount		X	X	X	X	
Wholesaler Supplied		X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary		X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	C	C	C		An approved list
Anti-substitution	X	X	X	X		
Quantity Limit	X	X	X	X		3 Rx's
Dollar Limit						
Size Limit						
Prior Authorization						
State MAC						
Co-payment						

STATE SUMMARY

State: OREGON

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	--	--	--	--	--	
Yearly Cost/Recipient	--	--	--	--	--	
Average Rx Price	--	--	--	--	--	
<u>DISPENSING FEE</u>						
Flat			X	X	X	
Variable						
Amount			2.35	2.55	2.70	
Percent Markup Used	50%	50%				+ \$.85
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.	X	X	X	X	X.	
Quan. Price/Select Product	X	X	X	X	X	
Federal Decile			X	X	X	
Decile Number			70%	70%	70%	
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	C	C	C	O	
Anti-substitution	X					7/1/77
Quantity Limit						
Dollar Limit						
Size Limit	X	X	X	X	X	One month supply
Prior Authorization	X	X	X	X	X	
State MAC	X	X	X	X	X	
Co-payment						

STATE SUMMARY

State: PENNSYLVANIA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	23.52	13.93	34.03	34.54	29.97	
Yearly Cost/Recipient	\$11.85	\$ 69.64	\$170.31	\$216.44	\$194.64	
Average Rx Price	\$ 4.76	\$ 5.00	\$ 5.01	\$ 6.27	\$ 6.49	
<u>DISPENSING FEE</u>						
Flat		X	X	X	X	
Variable						
Amount		1.85	1.85	1.93	2.00	
Percent Markup Used	50%					
<u>INGREDIENT COST</u>						
AWP		X	X	X	X	
AWP Less Discount						
Wholesaler Supplied	X					Wholesale Average
Direct Price/Select Prod.	X	X	X	X	X	
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X				Effective 1977
Quantity Limit	X	X	X	X	X	
Dollar Limit	X	X	X	X	X	
Size Limit	X	X	X	X	X	
Prior Authorization	X	X	X	X	X	\$15 or 45 day supply if exceeds
State MAC						maximums
Co-payment						

STATE SUMMARY

State: RHODE ISLAND

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	--	--	--	--	--	
Yearly Cost/Recipient	--	\$112.46	\$116.06	\$126.91	\$130.82	
Average Rx Price	--	--	--	--	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.95	2.00	2.00	2.18	2.20	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.	X	X	X	X	X	10 manufacturers
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	Calcul prices used
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X				Repealed 7/76
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	30 day supply or 100 tab
Prior Authorization	X	X	X	X	X	
State MAC	X	X	X	X	X	
Co-payment						

STATE SUMMARY

State: SOUTH CAROLINA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	14.60	19.75	20.25	19.72	19.27	
Yearly Cost/Recipient	\$64.44	\$93.88	\$103.38	\$114.60	\$112.11	
Average Rx Price	\$ 4.41	\$ 4.75	\$ 5.11	\$ 6.31	\$ 6.32	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.90	1.90	1.90	2.40	2.40	
Percent Markup Used						OTCs 50%
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount			X	X	X	7 1/2% discount
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile			X	X	X	
Decile Number			70%	70%	70%	
Actual Acquisition Cost						
Usual and Customary						
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	C	C	C	C	
Anti-substitution	X	X	X	X		
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	One month supply
Prior Authorization	X	X	X	X	X	Estab 1968
State MAC					X	
Co-payment				.50	.50	

STATE SUMMARY

State: SOUTH DAKOTA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	--	16.90	13.75	13.57	--	
Yearly Cost/Recipient	--	\$95.72	\$93.10	\$94.52	\$113.02	
Average Rx Price	--	\$ 5.67	\$ 7.27	\$ 7.26	--	
<u>DISPENSING FEE</u>						
Flat			X	X	X	
Variable						
Amount		2.25	2.25	2.37	2.50	
Percent Markup Used	40%					
<u>INGREDIENT COST</u>						
AWP		X	X	X	X	
AWP Less Discount						
Wholesaler Supplied		X	X	X	X	
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary		X	X	X	X	Used as average base
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X	X	X		
Quantity Limit						
Dollar Limit						
Size Limit		X	X	X	X	1 month
Prior Authorization						
State MAC		X	X	X	X	
Co-payment			.50	.50	.50	

STATE SUMMARY

State: TENNESSEE

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	25.92	30.65	31.75	31.80	34.72	
Yearly Cost/Recipient	\$108.93	\$137.45	\$151.07	\$159.90	\$189.73	
Average Rx Price	\$ 4.20	\$ 4.48	\$ 4.76	\$ 5.03	\$5.46	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.95	2.10	2.10	2.10	2.30	Effective 1/1/78
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost	X	X	X	X	X	Determined by post audit
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	O	O	O	O	O	
Anti-substitution	X	X	X			Repealed 1977
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit	X	X	X	X	X	Since 1971
Prior Authorization			X	X	X	
State MAC	X	X	X	X	X	Since 1972
Co-payment						

STATE SUMMARY

TEXAS
State: _____

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	17.39	18.94	18.93	19.78	19.54	
Yearly Cost/Recipient	\$100.46	\$117.54	\$129.55	\$149.51	\$159.00	
Average Rx Price	\$ 5.78	\$ 6.20	\$ 6.84	\$ 7.56	\$ 8.14	
<u>DISPENSING FEE</u>						
Flat						
Variable	X	X	X	X	X	
Amount	1.76 to 2.14	1.86 to 2.27	1.97 to 2.42	2.17 to 2.64	2.25 to 2.81	
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.			X	X	X	
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost	X	X	X	X	X	Audits
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X	X	X	X	
Quantity Limit						
Dollar Limit						
Size Limit	X	X	X	X	X	6 month supply
Prior Authorization						
State MAC						
Co-payment						

STATE SUMMARY

State: UTAH

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	26.46	--	19.26	24.44	--	
Yearly Cost/Recipient	\$91.26	\$114.96	\$97.20	\$130.27	\$142.01	
Average Rx Price	\$ 3.45	--	\$ 5.05	\$ 5.33	--	
<u>DISPENSING FEE</u>						
Flat						
Variable	X	X	X	X	X	
Amount	2.00	2.20	2.20	2.25	2.40	2.40 effective 10/1/77
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.				X	X	Not quite direct
Quan. Price/Select Product				X	X	60 brand name MAC/EAC
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary		O	O	O	O	
Anti-substitution	X	X	X			Repealed in 1977
Quantity Limit						
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Dexadrine, hyper kenesis, food suppl
State MAC			X	X	X	
Co-payment						

STATE SUMMARY

State: VERMONT

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	15.18	24.90	21.62	22.10	--	
Yearly Cost/Recipient	\$103.85	\$120.47	\$111.06	\$123.12	\$128.75	
Average Rx Price	\$ 6.84	\$ 4.84	\$ 5.14	\$ 5.57	--	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.75	1.85	1.85	1.85	2.00	Or 10% of cost if exceeds \$20.00
Percent Markup Used					10%	
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.				X	X	
Quan. Price/Select Product	X	X	X			
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary				X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary					O	
Anti-substitution	X	X	X	X		Repealed 1978
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit						
Prior Authorization	X	X	X	X	X	Non-covered drugs
State MAC						
Co-payment						

STATE SUMMARY

State: VIRGINIA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	25.51	20.59	19.31	20.51	22.07	
Yearly Cost/Recipient	\$106.02	\$103.61	\$104.53	\$121.28	\$140.93	
Average Rx Price	\$ 4.16	\$ 5.53	\$ 5.91	\$ 6.41	\$ 6.89	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X	X	
Variable						
Amount	1.95	1.95	2.10	2.25	2.48	OTCs
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.	X	X	X	X	X	If not found in state
Quan. Price/Select Product	X	X	X	X	X	
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary			X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X	X			
Quantity Limit						
Dollar Limit						
Size Limit						Not strict, recom- mend 30 da/100 unit
Prior Authorization						
State MAC						
Co-payment		.50	.50	.50	.50	Some cases

STATE SUMMARY

State: WASHINGTON

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	17.52	19.27	--	--	21.11	
Yearly Cost/Recipient	\$82.01	\$95.20	\$110.01	\$110.07	\$114.45	
Average Rx Price	\$ 4.68	\$ 4.94	--	--	\$ 5.42	
<u>DISPENSING FEE</u>						
Flat	X	X	X	X		
Variable					X	
Amount	1.95	1.98	2.19	2.29	2.42	Nursing homes lower
Percent Markup Used	40%					
<u>INGREDIENT COST</u>						
AWP						
AWP Less Discount						
Wholesaler Supplied	X	X	X	X	X	Special discount
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost	X	X	X	X	X	
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary	C	C	C	C	C	
Anti-substitution	X	X	X			September, 1977
Quantity Limit						
Dollar Limit	15.00	15.00	25.00	25.00	25.00	More requires approval
Size Limit	X	X	X	X	X	
Prior Authorization	X	X	X	X	X	
State MAC	X	X	X	X	X	1972
Co-payment						

STATE SUMMARY

State: WEST VIRGINIA

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rx's/Recipient	15.91	15.32	19.29	19.79	19.70	
Yearly Cost/Recipient	\$76.18	\$82.67	\$107.99	\$121.54	\$125.55	
Average Rx Price	\$ 4.79	\$ 5.40	\$ 5.60	\$ 6.14	\$ 6.37	
<u>DISPENSING FEE</u>						
Flat						
Variable						
Amount						
Percent Markup Used						
<u>INGREDIENT COST</u>						
AWP	X	X	X	X	X	
AWP Less Discount						
Wholesaler Supplied						
Direct Price/Select Prod.						
Quan. Price/Select Product						
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary			X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X	X	X		Repealed 7/78
Quantity Limit	X	X	X	X	X	
Dollar Limit						
Size Limit						
Prior Authorization			X	X	X	1 mo or 5 refills
State MAC	X	X	X	X	X	All injectables
Co-payment						

STATE SUMMARY

State: WISCONSIN

	1974	1975	1976	1977	1978	Comments
<u>UTILIZATION DATA</u>						
Yearly Rxs/Recipient	19.50	20.68	18.52	--	--	
Yearly Cost/Recipient	\$94.71	\$102.01	\$92.04	\$129.43	\$156.41	
Average Rx Price	\$ 4.86	\$ 4.93	\$ 4.97	--	--	
<u>DISPENSING FEE</u>						
Flat				X	X	
Variable	X	X	X			
Amount	2.05	2.05	2.05	2.32	2.53	1974-75 max 2.25
Percent Markup Used						OTCs 74-76 40% 77-78 33%
<u>INGREDIENT COST</u>						
AWP				X	X	
AWP Less Discount	X	X				
Wholesaler Supplied	X	X	X	X	X	
Direct Price/Select Prod.	X	X	X	X	X	9 companies
Quan. Price/Select Product	X	X	X	X	X	30 drugs
Federal Decile						
Decile Number						
Actual Acquisition Cost						
Usual and Customary	X	X	X	X	X	
<u>PROGRAM RESTRICTIONS</u>						
Open (O)/Closed (C) Formulary						
Anti-substitution	X	X				
Quantity Limit						
Dollar Limit					-	
Size Limit	X	X	X	X	X	30 day supply
Prior Authorization	X	X	X	X	X	Certain drugs
State MAC	X	X	X	X	X	
Co-payment						

Health Care Financing Grants and Contracts Reports

U.S. Department of Health and Human Services
Richard R. Schweker, Secretary

Health Care Financing Administration
Carolyne K. Davis, Administrator

**Office of Research, Demonstrations, and
Statistics**
James M. Kaple, Acting Director

**Jean LeMasurier, Director, Program Planning
and Support**

**Karen Pelham O'Steen, Research Publications
Coordinator**

Donna L. Eskow, Writer-editor

Carol J. Pianalto, Writer-editor

Alice L. Young, Writer-editor

Cynthia Dingle, Editorial Assistant

The statements and data contained in this report are solely those of
the contractor or grantee and do not express any official opinion of or
endorsement by the Health Care Financing Administration.

Send changes of address or requests for this publication to:

ORDS Publications
Rm 1E9 Oak Meadows Building
6340 Security Blvd.
Baltimore, MD 21235.

DEPARTMENT OF
HEALTH AND HUMAN SERVICES
HEALTH CARE FINANCING ADMINISTRATION
BALTIMORE, MARYLAND 21207

CMS LIBRARY

3 8095 00012201 6



OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300



HHS Department of
Health and Human Services
Health Care Financing Administration
HHS Publication
HCEA Pub. No. 03102 April 1981